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Poverty and income distribution in the transition economies of central and eastern Europe and central Asia

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Poverty and income distribution in the transition economies of Central and Eastern Europe and Central Asia

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BY

Andreea Chiritescu

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Poverty and Income Distribution in the Transition Economies of Central and Eastern Europe and Central Asia

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2005

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ABSTRACT

For the transition economies of Eastern and Central Europe and Central Asia, this study reveals that poverty and income distribution move in the same direction.

Following a low income inequality and a target of zero poverty before 1989, the transition caused a worsening of distribution of income and wealth, and an increase in absolute poverty.

Using simple trend analysis, some factors that have a positive influence on poverty in these transition economies are the external debt ratio and the population growth rate, and some factors that have a negative influence on poverty are foreign aid, external debt, foreign direct investment, GDP growth, GDP per capita, exports, trade, domestic savings, HDI, life expectancy, and health expenditures.

A more rigorous econometric analysis shows significance only for corruption, GDP growth rate, GDP per capita, health expenditures and the human development indicator. Moreover, the $2 poverty line performs better in explaining the variation in poverty.

Still, these results must be looked upon with caution for several reasons. First, even though the sample size is large (23 out of 26 transition economies in CIS and CEE countries are studied here), the number of observations (from a statistical perspective) is rather small. Secondly, several explanatory variables are not accurately measured. Last but the most important, a study on countries undergoing many structural and institutional changes needs to be supplemented with other types of analysis, such as individual country studies.

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CHAPTER I

INTRODUCTION

1.1 Statement of the Problem

In the fifteen years since the fall of the Berlin Wall, the New Europe[1] diverged from the former Soviet Union. From the economic standpoint, the 15 New European countries have largely recovered from the depression that followed the end of central planning. All are democratic states now, and they are almost entirely at peace. Ten are already in North Atlantic Treaty Organisation (NATO), and the rest have a good chance of joining; eight countries have joined the European Union, two more are targeted to join in 2007, and the rest have real possibilities to join in the future. Most will be using the Euro as currency within a decade. In contrast, most of the former Soviet states have not yet recovered from the economic and political collapses following the end of the communist regime[2]. Belarus, Turkmenistan, and Uzbekistan are still dictatorial states. None of them are on the road to the European Union[3].

Less than 16 years ago, the Soviet Union and its Central and Eastern European satellites seemed locked in a tight military, political, and economic embrace. The Soviet army occupied most of them, they were military allies, their societies were organized around communist ideology, and most of the trade was with each other. There was an Iron Curtain dividing Europe. What is now the New Europe was on the other side of it, along with the Soviet Union. These were all countries going through a post-communist transition.[4]

During the initial phase of transition of these economies, the attention of economic researchers and donor institutions was focused on macroeconomic stabilization and privatization but not on the possible poverty increase and its alleviation.[5]

Mainstream analyses of the transition process generally emphasized the need for action in six areas: macroeconomic stabilization, price liberalization, trade liberalization and current account convertibility, enterprise reform (especially privatization), the creation of a social safety net, and the development of the institutional and legal framework for a market economy (including the creation of a market-based financial system). Major controversies arose over the speed and sequencing of reforms and the strategy to be followed in each area. The debate over the speed of reform was frequently cast in terms of 'big bang' or 'shock therapy' versus gradualism. In practice, the big bang could apply only to certain aspects of the reform process – macroeconomic stabilization and price and trade liberalization – for the other three elements of the reform process inherently take time. However, decisions to initiate action and proceed in the other three areas could be taken earlier or later (See Fischer, Sahay and Vegh 1996b, p. 46).

It was expected that during the transition to capitalism some segment of the population will have their basic needs unfulfilled because the social safety net would be largely removed as the state lost control of vast amount of resources. Indeed, the creation of social security that could have largely alleviated the emerging poverty in the region met with indifferent attitudes in the midst of efforts toward large-scale restructuring of the economies. Optimism ran high that the new economic system would be able to restore and enhance growth soon, which would be instrumental in containing any slide toward poverty that could occur during the preceding transition.

What did actually happen? The problem that I attempt to address in my thesis is what trends in poverty and income distribution emerged in the region and what the key factors that could explain the subsequent evolution of poverty are. Does a higher per capita income enable a country to substantially reduce poverty or does income distribution also need to be considered in an effort toward poverty alleviation? What are the other factors that determine whether a country in transition is likely to succeed in improving its poverty situation?

1.2 Objectives of the Study

My study has the following objectives:

1. To develop an analytical framework for examining the trends in poverty and income distribution, and relate these trends to some key economic variables, so as to gain a better understanding of the underlying relationships.
2. To formulate an econometric model and estimate it to see in what ways and how strongly the major economic and some non-economic variables influence the incidence of poverty. I also want to examine if the human development index, whether in an aggregative form or in terms of its constituent ingredients, is linked to poverty in an important way.
3. To inquire if my study and other similar studies have important policy implications.

1.3 Importance and Limitations of the Study

The transition of the countries in my research started 16 years ago and much of the first phase of the transition has been complete in most countries for some years. It is time that reasonably serious research was conducted on what happened to some of the highly important, albeit largely ignored, aspects of transition such as poverty and income distribution. I attempt to contribute in this area.

Econometric analyses of the economy-wide aspects of transition are few and far between. I supplement the tabular and graphical analysis of poverty with some econometric exercises to add strength to my arguments about the relationship of poverty with other variables. I include 23 out of a total of 26 transitional economies in my sample. Because of major institutional and structural changes that have occurred in these economies, however, the results of my empirical models can only be interpreted with a high degree of caution. In the last chapter, I conclude my study by outlining interesting possibilities for further research.

CHAPTER II

REGIONAL BACKGROUND

The Commonwealth of Independent States (CIS) comprises: Armenia, Azerbaijan, Georgia (Caucasus); Belarus, Moldova, the Russian Federation, Ukraine (European CIS); Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan (Central Asia). Turkmenistan is not studied here because of limited data availability.

The Central and Eastern Europe (CEE) transition economies comprise: the Czech Republic, Hungary, Poland, Slovakia (Central Europe); Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the former republic of Macedonia, Poland, Romania, Slovenia (Balkan); Estonia, Latvia, Lithuania (Baltics). Bosnia and Herzegovina and the former republic of Macedonia are not studied here because of limited data availability.

2.1 Moving Away from Socialism

There were many things wrong with the socialist systems: stagnant incomes, slow growth, rationed goods, and few civil liberties. From an economic standpoint, slow growth was the main reason why these countries moved away from socialism.

On the one hand, the socialist systems brought three significant benefits relative to market economies of a comparable income level: high levels of health and education (one of the instruments for prevention of poverty was free health and child care and free education); a relatively high degree of income security (production by target with no budget constraints led to unlimited demand for labor, but employees were paid relatively

low net wages with low returns to education); and low incidence of income aspects of poverty (another instrument for prevention of poverty was high labor force participation rates for women and subsidization of essential products) (Krumm, Milanovic and Walton, 1994, p. 1).

On the other hand, the failures of the economic (socialist) system meant small prospects for income growth; and income security is a small comfort when one can't buy the goods one wants. Yet a rise in insecurity is a striking feature of the initial phase of the transition to capitalism (Krumm et al 1994, p. 1).

2.2 Similarities

A common characteristic of these countries in Europe and Central Asia is that all twenty-three of them have been struggling with the transition from a planned economy to a market economy, and they are all developing countries. All the CIS and some CEE countries gained their independence in early 1990s. The following decade was characterized by internal struggle to recover not only from deep recession shocks in structural and institutional factors but also from civil disturbances.

Under the central planning system, in most of the CEE countries and the former Soviet Union, agricultural producers and food consumers were supported with heavy subsidies; moreover, a planned inter-country trading regime among the centrally planned economies dominated their trade patterns. In most of the countries, liberalization implied price and subsidy cuts, because of the heavy consumer and producer subsidization. In many countries the combination of the fall in the real price of output and the rise in the real price of inputs led to a crisis in the agricultural sector[6].

2.3 Differences

These economies are characterized by different GDP growth rates; the economic declines were much deeper and the recoveries much slower in the former Soviet countries than in Central and Eastern Europe; they received different amounts of international aid and foreign direct investment; they had different inflation rates over the years; they range from lower income to upper middle income countries; they started with a small or large external debt; and their political leaders applied different policies with different goals in mind.

Rosapepe (2004) accentuates that the difference in the longevity of communist rule also had an important impact. The Commonwealth of Independent States had been communist for 70 years, while New Europe had been communist for only 45 years. The extra 25 years of communism in the former Soviet states means that virtually no one alive there today remembers life before communism. Also, in little more than a decade, the New European trade has moved away from the Soviet bloc. In 1988, more than half of their trade was with the Soviet Union and its satellites; less than a third was with the European Union. Today, about three fourths of their exports go to the European Union.

Swinnen and Beerlandt (2002) argue that in CEE countries, the decline in output coincided with a strong increase in labor productivity because of a heavy outflow of labor from agriculture. In contrast, in the CIS, both output and productivity declined throughout the first transition decade and only started recovering after 1999.

Overall, the future perspectives for CIS and CEE countries are positive; these countries have high hopes of further economic growth which would lead to a more equitable income distribution and hopefully alleviation of poverty.

2.4 The Emergence of Poverty

The economic transition in Central and Eastern Europe began in January 1990, with the Polish big-bang reform program. It was generally believed that the transition would start with a recession, caused both by restrictive macroeconomic policies and by the restructuring of the economy required by the shift to a market economy. It was much less clear how long the initial recession would last, and when sustainable growth would begin. That would depend on the initial conditions facing the economy, subsequent shocks, the external environment (including aid), and economic policies (Fischer et al. 1996a, p. 230).

As expected, the early days of reform brought heightened insecurity and falling incomes (in part due to high inflation). Households were hit by multiple shocks in the early days of transition: output and income crashed (mostly tied up either with the loss of external markets or the disorder in resource allocation); as the employment guarantee disappeared, unemployment emerged. Government revenue also came under pressure, due to the fall in real incomes and the pressure on enterprise profits (the transitional source of state cash); therefore the government was forced to diminish the social safety net (Krumm at al. 1994, p.27).

As Ray (1998) asserts, the primary objective of the world's nations is economic development: to raise the income and economic capabilities of a country, accompanied by an increase in life expectancy, access to sanitation, clean drinking water and health services, reduction of infant mortality, and increased access to knowledge and schooling.

Poverty brings bad roads, bad smells, no women's rights (oppression of women), no electricity, no doctors, no schools, no education, no medication, no telephone, no

running water, no sewage, high infant mortality, hunger and famine, oppression and working children (including prostitution) (Easterly 2003, p. 6).

Economic theory tells us that one of the most effective ways to reduce poverty is macroeconomic growth. An economic expansion is accompanied by increased labor market opportunities which benefit the poor more than the rich, leading to a fall in poverty. Birsdall and Szekely (2003) find empirical evidence that tells us that there is an inverse relationship between poverty and economic growth, but for the growth to have an effect on poverty, it has to be noticeable.

The empirical evidence also suggests that growth requires inflation stabilization and that stabilization leads to growth. Moreover, for growth to begin, the annual inflation should be less than 50 percent. A fixed exchange rate and smaller fiscal deficits seem especially important in reducing inflation and raising growth rates, therefore reducing poverty (Fisher et al. 1996b, p. 62).

The situation is more complex in transition economies: even though some of the countries are relatively well endowed with physical and human capital, there are serious constraints on growth and poverty reduction. Problems with stabilization, liberalization, privatization, corruption, unemployment, and inflation can be an issue even for the richest countries. An important feature of all transition economies is a simultaneous decline in income and an increase in inequality, both effects contributing to the rise of poverty in these countries.

Income Distribution

The former communist countries are set on a course toward some form of capitalism, which by definition means greater risk-taking, less income security, and almost certainly greater inequality in income distribution.

There are significant tradeoffs between moving to a welfare state and shifting to a dynamic, growing economy. The transition economies don't have the real levels of productivity or the tax bases needed to sustain the kind of tax effort a large-scale system of transfers would require (Krumm et al. 1994, p. 28). Under either scenario, those whom the transfers are supposed to protect – the old, the poor, the disabled, and the unemployed – are most likely to suffer disproportionately over the medium to long term, and probably even in the short term[7].

Social Safety Nets

Eastern European and Central Asian countries had a universal system of social protection before the break-up of the Soviet Union that can be characterized by: the guarantee of employment during the workers' productive lives and a pension during their old ages; labor market rigidities caused by archaic laws and regulations, which restricted labor mobility and minimized flexibility of the labor force; availability of social assistance and disability benefits to individuals and families to protect them from poverty. The universal coverage and benefits were made possible through: labor hoarding, which thereby restricted labor mobility; defined-benefit pension schemes with pensions based on earnings right before retirement; social assistance benefits in cash and in-kind based on special categories or privileges rather than on needs; easy enforcement of social security contribution in state-owned enterprises (World Bank 2004, p. 3).

Since the beginning of the transition, these countries have faced the dual task of promoting economic growth while providing social protection services. The speed of social protection reforms in these countries have not kept pace with the new dynamics of the economic environment.

The transition created an unsustainable pension system. The pay-as-you-go system became financially unsustainable because of: an increasing number of pensioners (due to early retirement); declining birth rates; an overly generous formula in relation to the given scarce public resources available; and destabilization of the dependency ratio between the number of contributors to the system and the number of pensioners. Also, the transition created an ineffective social assistance. Although a number of countries have begun means-testing social assistance, including social insurance and disability benefits, services were still widely provided regardless of individual need. Most eligibility criteria have been based on historical rights, such as being veterans of wars, mothers with many children, victims of political repressions, and others (World Bank 2004, p. 4).

Food Security

The changes induced by the first reforms in the transition economies had consequences on food security. In comparison with countries of similar income levels, before the transition, Central and Eastern Europe and former Soviet countries had high levels of food consumption, sustained by food subsidies which kept food prices low. The initial drops in food intake (kcal/capita) during transition were a consequence of not only lack of food availability but also of a sudden lack of access to food due to the collapse of these subsidies. Income declines and disruptions of social support systems also contributed to the initial drop in food entitlement. Generally, food intake remained stable

over the whole transition period, compared with output falls and with income drops. In the poorer countries, households turned quite drastically to household food production. In some countries the share of household production in total consumption doubled. Even among the urban population, 'kitchen gardens' became important. Especially in the former USSR, this shift was combined with increasing informal social exchange, helping networks, and barter trade. Diet composition shifted towards cheaper, but inferior energy sources (e.g. replacing cereals by potatoes) (Swinnen, & Beerlandt 2002).

CHAPTER III

REVIEW OF LITERATURE

The economic literature is rich in analyzing the poverty issue or the transition economies. Most of the literature on transition economies tackles the issues of economic growth, initial conditions, inflation, price and trade liberalization, stabilization, enterprise reform, social protection, strategies, and policies. Unfortunately, there is not much of poverty discussion in the literature relevant to transition economies. Therefore, my literature review comprises summaries of articles regarding poverty in transition economies, some of transition economies, and some of poverty in general.

Milanovic (1998) makes a comparative study of poverty for eighteen countries from Europe and Central Asia, and the post-communist transition. He considers a common poverty line of \$4 PPP[8] per capita per day to compare poverty rates and poverty deficits both among countries and within a given country at different points in time.

He uses two measures of poverty. The first is the *headcount index*, the percentage of people who are poor because their income is below the poverty line, and the second is the *poverty deficit*, the sum of all income shortfalls, i.e. the difference between the poverty line and income. His study is based on the assumption that lower income and greater income inequality are two of the most important factors determining the increase in poverty. Moreover, an important feature of all transition economies is a simultaneous decline in income and an increase in inequality, both effects contributed to rising poverty in these countries.

His approach to poverty is based on the formula:

$$\frac{PD}{GDP} = \frac{s \times z \times P}{y \times N} = \frac{s \times z}{y} \times HC \text{, where}$$

PD is the poverty deficit,

s is the average income shortfall of the poor (in percent),

z is the poverty line,

P is the number of poor,

y is the GDP per capita,

N is the population, and

HC is the headcount index.

Milanovic finds that a given absolute decrease in income will raise the poverty deficit more in the case of a poor country (Estonia) than it will in the case of a richer country (Hungary). And a uniform decline in income (equivalent to an increase in the poverty line) will have more than a proportional impact on the poverty deficit. Also, if percentage declines in income are the same in poor and rich countries, the poverty deficit will increase, proportionately more, in rich countries. And, for a given absolute decrease in income, the poverty headcount will increase more for a poorer than for a richer country, so the higher the income, the smaller the effect of a given change in income on the headcount index.

When looking at the results, for all 18 countries, poverty rates increased, the total estimated number of the poor has risen from 4 percent to 45 percent. But the headcount increase was very uneven: in richer countries such as Czech Republic, Hungary, Slovak Republic, and Slovenia the percentage of poor rose, on average, from less than 1 to 2 percent; in Poland it rose from 6 to 20 percent. In poor countries such as Russia the

percentage of poor rose from 2 to 50 percent. The Central Asian countries reached a 60 percent headcount index.

Differences in how much poverty has increased do not depend only on how much real income has declined and how much income inequality has risen, but also on the absolute level of a country's income. Richer countries will have lower poverty headcount than poor countries, even if their incomes declined by the same percentage[9].

Milanovic reminds us that it is common for transition economies to have underreporting of income. So, when he uses expenditures instead of income, the results change: there is still poverty, but it is smaller by more than one-third.

The World Bank (2000a) offers some explanations for the increase in poverty in the European and Central Asian transition economies. The authors choose a $2.15 PPP poverty line and they take into consideration the social and economic dislocation of transition that leads to a decrease in output, government revenues and household incomes, and a large increase in income inequality.[10]

The authors find that the decrease in output was pronounced throughout the region and was accompanied by an increase in poverty[11]. Also, they find a decline in employment for all transition economies due to a sharp drop in the demand for labor. Moreover, the countries of Europe and Central Asia entered the transition process with some of the lowest levels of income inequality in the world, but the inequality has increased steadily in all transition countries. The rise in inequality is in part attributed to positive developments: rising returns to education, a decompression of wages, and returns to risk taking and entrepreneurship. Despite the resulting increase in inequality, these

forces are welcome because they signal that the market is now working to reward skills and effort, as in more mature market economies.

The World Bank (2000a) also analyzes public action needed to reduce poverty: building institutions to support poverty reduction strategies; creating opportunities for poverty reduction by economic growth; improving capabilities (quantity and quality) in health and education systems; providing the right amount of social protection; and reducing income inequality.

Widespread poverty in transition countries in Europe and Central Asia need not be a permanent phenomenon. Economic and social policies have been effective in reducing poverty elsewhere in the world and could be effective in Europe and Central Asia if these governments choose to pursue them.

The early years of the economic transition process in the 26 countries of Eastern Europe and the former Soviet Union are studied by Fischer, Sahay and Vegh (1996a). These authors find that by 1995, growth returned to half of the countries in the sample. The return to growth is heavily concentrated in Eastern Europe and the Baltic countries – all but one of which started growing by 1994[12]. In the countries in which growth has returned, the average transitionary recession lasted 3.6 years[13]. The transitionary recessions were extremely deep, with an average of reported output decline of 33.6 percent. In the countries in which the growth had not revived by 1994, output has so far fallen for 4.7 years, with a cumulative reported average decline of nearly 50 percent. Some countries, particularly those affected by wars, such as Armenia and Georgia, have suffered extreme economic hardship. The transitionary recession in other countries,

particularly the strong reformers, was shorter and less pronounced, though still deeper than the average recession in a market economy.

The differences in the recession and growth experiences among these economies can be explained by several factors. First, the time it took the government to build up a stabilization program – the countries that brought inflation below 50 percent per annum experienced growth within two years; also, except for Romania, no country has experienced growth without reducing inflation to below 50 percent per annum. Second, fiscal discipline also helped the economic growth: countries further along in reforming their banking systems and enterprises (including privatization) grew faster. Third, the political dimensions of reform: countries that are reluctant converts to democracy and the market system were slow to stabilize and carry out structural reforms; this difference is correlated with how long countries were in the Soviet orbit.

For countries with high inflation and very little liberalization, the authors find a negative growth. The population growth rate in most of the transition economies is very low and falling, which means lower aggregate growth but higher per capita growth.

Birdsall and Szekely (2003) bring to our attention the vicious circle of poverty: low growth contributes to the persistence of poverty (particularly given high inequality), and high poverty and income inequality contribute to low growth. One thing is certain, there is an inverse relationship between poverty and economic growth, but for the growth to have an effect on poverty, it has to be noticeable. In Latin America, a low GDP growth means limited creation of new jobs, fewer public resources for education and health, and high inequality. The effect of the GDP growth on poverty was even less than it might

have been in absence of inequality. There are some examples worth mentioning. In Mexico, the GDP per capita increased by 9.7 percent between 1996 and 1998, but the percentage of population living in poverty stayed the same. In Chile, the GDP per capita increased by 30 percent in real terms between 1992 and 1996, and moderate poverty declined by 20 percent; but the income inequality increased. If the income distribution had stayed the same, the decline in poverty would have been higher.

The conclusion of Birdsall and Szekely's study is that growth in Latin America in the 1990s made little difference for poverty reduction because the economic growth was modest and the growth provided less than proportionate gains for poor people.

Easterly (2001) starts by describing a shocking account for poverty in Pakistan: 85 percent of population is poor; they live on less than $2 a day, and 31 percent of population lives in extreme poverty, on less than $1 a day. This absolute poverty brings with it bad roads, bad smells, no women rights, women's oppression, no electricity, no doctors, no schools, no education, no medication, no telephone, no running water, no sewage, high infant mortality (200 out of 1000 live births), hunger and famine, oppression and working children (including prostitution). He considers two ways the poor could become better off. First, an income redistribution from rich to the poor, and second the income of both rich and poor to rise with overall economic growth. Which is more effective: income redistribution or economic growth?

He mentions a study made by Ravallion and Chen for 1981-1999 (accounting for people living on less than $1 PPP a day) that showed that "fast growth went with fast poverty reduction, and overall economic contraction went with increased poverty".

Ravallion and Chen compared the change in poverty in countries with the fastest growth with the change in poverty in countries with the fastest decline. The results seem logical: the increases in poverty are extremely acute in the economies with severe economic declines (Eastern Europe and Asia); on the other hand, countries with positive income growth had a decline in the proportion of people below the poverty line. A different result emerges for Eastern Europe and Asia. The fastest average growth is associated with the fastest poverty reductions. For poverty to get worse with economic growth, the distribution of income would have to get much more unequal as income increased.

Easterly also mentions a study made by Dollar and Kraay, who found that a 1 percent increase in average income of the society translates one for one into a 1 percent increase in the incomes for the poorest 20 percent of the population.

Both studies suggested that economic growth has a greater influence on poverty than income redistribution.

Blank and Card (1993) study poverty for the period 1968 to 1992 in United States. Using differences in regional growth rates, unemployment, and wages, they estimate the effects on poverty and income distribution. They find that significant regional differences in income growth and unemployment determine variations in poverty rates in both level and trend across regions: without controls for region and year effects, poverty is only weakly related to unemployment, and the addition of region and year effects leads to a significant positive relation.

Blank and Card's conclusion is that family income and poverty are closely related to conditions on the labor market, and they explain the failure of poverty rates to respond

to robust GDP growth during the 1980s as due to the combination of slow productivity growth and widening wage inequality that accompanied the expansion of the 1980s.

Another useful study of poverty is made by Wright (1996). He examines the relationship between household structure and poverty in the United Kingdom, taking into account the changing composition of the population by household type because poverty rates differ dramatically by household type. For example, poverty rates, on average, are much higher in one-parent households than two-parent household. Wright concludes that for the period from 1968 to 1986, there has been a decrease in absolute poverty and an increase in relative poverty in UK.

Ray (1998) starts by reminding us that the primary objective of the world's nations is economic development. To raise income, well-being, economic capabilities, life expectancy, access to sanitation, clean drinking water and health services, to reduce infant mortality, increase access to knowledge and schooling, and rise literacy is 'the most crucial social task.' Then he makes the following observations about the distribution of income. First, over the period 1960-1985, the relative distribution of world income appears to have been stable. The richest 5 percent of the world's nations averaged a level of per capita income that was about twenty-nine times the per capita income for the poorest 5 percent of countries (and the comparison of per capita income was made in PPP values). Second, even though the overall distribution has remained stationary, there has been movement of countries within the world distribution. Third, poor countries seem

to have the advantage to use, relatively free of charge, technologies that are developed by richer countries, and they can learn from the richer countries mistakes.

Next, Ray talks about the income distribution in developing countries. He referrs to "the inverse U- shape" hypothesis: income inequality first rises and then falls as per capita income increases as we move from poor to rich countries. This can be easily seen when plotting income shares of the richest 20 percent and the poorest 40 percent for a number of countries arranged in order of increasing per capita income. For the poorest 40 percent, as the income per capita increases, the income share first decreases then increases, therefore a U-shaped trend. For the richest 20 percent, as the income per capita increases, the income share first increases and then decreases, hence the inverse U-shaped trend. Moreover, income is more unequally distributed in developing countries than in developed countries, which suggests that the poor in developing countries are hit twice: once at the level of distribution across countries and then at the level of distribution within countries.

In September 2000, the World Bank released the report, "Anticorruption in Transition: A Contribution to the Policy Debate" as the first comprehensive study of corruption faced by business communities in the transition countries of Commonwealth Independent Sates (CIS) and Central and Eastern Europe (CEE). Based on a survey of firms, the report demonstrated the variation not only in the level of business-related corruption across the transition countries, but also in the different forms and patterns of corruption that characterized different groups of countries. While the perceptions of corruption in the CIS are among the highest of all countries included in the sample, the

corruption levels in countries of CEE, while lower, are still at levels considerably higher than those in the OECD countries.

The expansion of corruption in the decade of transition has coincided with a sharp, initial decline in output and significantly higher levels of poverty and inequality across the region. The empirical studies show that it is the poor who bear the heaviest brunt of corruption. Corruption weakens public service delivery, misdirects public resources, and holds back the growth that is necessary to pull people out of poverty. Corruption undermines the driving forces behind the reform, drives new firms into the underground economy, and drives away foreign investors in frustration. As a result, some countries risk becoming trapped in a vicious circle in which pervasive corruption reduces public revenues, undermines public trust, and weakens the credibility of the state.

The second report, released by the World Bank in 2004 presents encouraging results concerning trends in corruption in the transition economies of CIS and CEE.

CHAPTER IV

METHODOLOGY AND DATA SOURCES

The methodology I use is primarily driven by the main goal of my thesis: how changes in economic growth, human development indicators, income inequality and other factors have influenced poverty in twenty-three transition economies from Europe and Central Asia over the period 1990-2002.

4.1 Poverty Measurements

In this paper I use two poverty lines to measure the incidence of poverty: one absolute poverty line of $1 per capita per day ($1.08 at 1993 international prices), and one poverty line of $2 per capita per day ($2.15 at 1993 international prices), measured in purchasing power parity adjusted terms[14].

The purchasing power parity (PPP) for any country is the ratio of its domestic currency expenditures on a given basket of goods and services to the value of this basket at international prices. International prices are constructed for a basket of goods and services by averaging the prices (expressed in a common currency) for each good and service over all different countries. National income for a country is then estimated by valuing its outputs at these international prices. This way, what is maintained, in some average sense, is the parity in the purchasing power among different countries[15].

A heavily discussed issue is how to measure poverty. Is it better to regard poverty as a relative or an absolute concept? What is an appropriate poverty line? What is the appropriate unit of analysis: the household, the family or the individual?[16] The most basic

summary measure of poverty is the head-count ratio, which is simply the percentage of poor individuals in a population, where an individual is poor if his/her available resources do not meet his/her needs at some minimum level called the poverty line. Another measure of poverty is the Foster, Greer and Thorbecke (1984) poverty index that takes into account the relative number of poor, capturing the incidence of poverty; the average level of income of the poor, indicating their average deprivation; and the distribution of income among the poor, indicating their degree of relative deprivation.

The World Bank (2000) uses both $1 ($1.08 at 1993 international prices) per capita per day and $2 per capita per day ($2.15 at 1993 international prices) as its two poverty lines. Then a poverty headcount is calculated as the percentage of people that are living below each poverty line. Some other authors have used a $4.30 national poverty line as well (World Bank, 2000a) to allow for different social, political and economic conditions in different countries or regions. The $1 and $2 a day poverty lines remain, however, the most popular measures of poverty line.

Problems also exist in comparing poverty measures within a country. For example, the cost of living is higher in urban than in rural areas, so the urban poverty line should be higher than the rural poverty line. Still, the difference between urban and rural poverty lines found in practice does not properly reflect the difference in the cost of living. Comparisons across countries at different levels of development also pose a potential problem, because of differences in the relative importance of the consumption of nonmarket goods.[17]

I examine the relationship of key economic variables and poverty in a sequential manner. First, I use the scatter plots of per capita income, aid per capita, debt ratio, debt

per capita, export and trade ratio, foreign direct investment, GDP and population growth rates, investment ratio, life expectancy, health expenditure ratio (as published in the World Development Indicators CD-ROM 2002), and Human Development Index (HDI) against the incidence of poverty.

The HDI is a summary measure of human development. It measures the average achievements in a country in three basic dimensions of human development. The first one is a long and healthy life, as measured by life expectancy at birth. The second is knowledge, as measured by the adult literacy rate and the combined primary, secondary and tertiary gross enrolment ratio. And the third dimension is the economic standard of living, as measured by gross domestic product per capita[18]. The HDI is constructed by the UNDP and reported in the Human Development Report 2003.

The surveys on poverty data in the transition economies were conducted in different years from 1996 to 2002, and in order to have good representation of the prevailing situation, I use the economic growth and human development indicators from the same years as the respective survey years. For example, the Albania survey was conducted in 2002 and the Czech Republic survey in 1996. Therefore the economic growth and human development indicators I used in the graphs are from 2002 for Albania and 1996 for Czech Republic.

4.2 Measurement of Income Distribution

Poverty can be closely related with income distribution in an economy. As development proceeds, a change in poverty can occur due to economic growth (given income distribution) and due to a change in income distribution itself. [19] Economic

inequality is the fundamental disparity that permits one individual certain material choices, while denying another individual the very same choices. I analyze income distribution data to see if an increase in income inequality is associated with an increase in poverty.

A good measure of economic inequality should satisfy four criteria: (i) the anonymity principle (names do not matter); (ii) the population principle (the population size does not matter as long as the composition of different income classes stays the same in percentage terms); (iii) the relative income principle (only relative incomes matter for the measurement of inequality, and not the absolute amounts involved); and (iv) the Dalton transfer principle (if a transfer of income is made from a relatively poor to a relatively rich person, then the inequality measure shows an increase)[20].

One of the common ways to represent income inequality is the Lorenz curve. It graphically displays the cumulative shares of income earned by cumulatively increasing fractions of the population, arranged from poorest to richest. A useful property of the Lorenz curve is that it arrives at the same ranking of income distribution as is created by a measure that satisfies the four principles stated above.

A popular summary measure of income inequality is the Gini concentration ratio or, simply, the Gini coefficient. It is the total of the absolute differences between all pairs of incomes divided by population squared and mean income. It is Lorenz consistent, and is equal to the ratio of (a) the area between the Lorenz curve and the perfect equality line (the 45° line) to (b) the area of the triangle below the perfect equality line.

When comparing income distributions across countries, we can test whether data reflect the existence of an inverted U, based on the Lorenz curves and Gini coefficients.

This is the famous Kuznets (1955) hypothesis that states that the inequality first rises with per capita income and then, after the economy has passed a certain income threshold, the inequality begins to fall. In cross-section data for any given year, the rise and fall of inequality could be found as we move from poorer to richer countries. It will be interesting to examine if this hypothesis holds for the transition economies studied in my study.

4.3 The Econometric Model

I present the results of my research in two main sections of the next chapter. As a background to the results of my econometric model, I analyze the relationships between poverty, income distribution and other social and economic indicators using tables and graphs. A second reason for the tabular/graphical analysis is that it provides a useful supplement to econometric results that are based on the data for transition countries that have recently gone through abrupt changes in many sectors of their economies. The existence of large nonlinearities that are inherent in such structural transformations implies that the results must be interpreted with a greater degree of caution than for any other groups of countries where the change is much smoother.

Next, I estimate multiple regression models explained below to understand the nature of poverty in the transition economies. There are three distinct purposes of this approach in my study. The first is to find out which of the economic and human development indicators have more explanatory power in the regression of poverty. A second objective of the regression exercises is to see if it is better to use separately the components of the human development index (HDI) than the unified index itself. This

will be important for countries that can only hope to improve one or another of the components that constitute the overall HDI. A third objective is to find which of the two poverty lines – $1 or $2 a day – serves as the more appropriate basis for poverty analysis in the transition economies.

Thus, to examine the influence of the human development and some key economic indicators on poverty in my sample over the period 1990-2002, I use cross-sectional data for 23 out of the 26 transition economies from Europe and Central Asia. Macedonia, Serbia-Montenegro, and Bosnia-Herzegovina are excluded from the sample because they were separated from Yugoslavia later in the 1990s and because of limited data availability. It would have been more realistic to use time-series together with cross section data, but unfortunately the data on such panels is not available.

The economic indicators that could serve as explanatory variables for poverty are: aid per capita, the degree of corruption, external debt as a percentage of GDP, foreign direct investment per capita, GDP growth, inflation, female labor force participation rate, and population growth rate. The importance of all these variables has been discussed in the literature reviewed in Chapter 3.

In addition, the human development indicators can have significant influence on poverty, as well. These indicators are: life expectancy at birth, education coefficient, GDP per capita, and health expenditure as percentage of GDP. The overall index HDI includes the first three of these as its components.

For most of the independent variables (except corruption and HDI), I use the seven-year averages, starting back from the most recent year for which the poverty data could be obtained. An average indicator over several years seems the only sensible

approach because all the variables swung widely once the transition process began. For example, Poland's annual GDP growth varied from -7 percent in 1991, to 7 percent in 1995, to 1 percent in 2001. Secondly, I choose to work with seven-year averages because the newest poverty data for each country comes from household surveys conducted in different years, and since this is a cross-section study, the periods overlap. Even though a majority of countries have had surveys in 1998, 1999, and 2000, for Czech Republic and for Slovak Republic, the newest survey data is from 1996, and in one instance, Albania, the data is from 2002. Thirdly, the seven-year average (and not a larger time frame) is suitable because of lack of data for some of the variables.

The estimated regression equations that I discuss and estimate in this and next chapters are as follows:

$$\mathbf{Pov(k)}_j = \alpha_0 + \alpha_1 \mathbf{Aid\_pc}_j + \alpha_2 \mathbf{Corr}_j + \alpha_3 \mathbf{DebtR}_j + \alpha_4 \mathbf{ln(FDIpc)}_j + \alpha_5 \mathbf{GDPg}_j + \\ + \alpha_6 \mathbf{ln(Infl)}_j + \alpha_7 \mathbf{FLFPR}_j + \alpha_8 \mathbf{Pop\_g}_j + \alpha_9 \mathbf{ln(GDPpc)}_j + \alpha_{10} \mathbf{LifeE}_j + \\ + \alpha_{11} \mathbf{Edu}_j + \alpha_{12} \mathbf{Health}_j \qquad (1)$$

and

$$\mathbf{Pov(k)}_j = \beta_0 + \beta_1 \mathbf{Aid\_pc}_j + \beta_2 \mathbf{Corr}_j + \beta_3 \mathbf{DebtR}_j + \beta_4 \mathbf{ln(FDIpc)}_j + \beta_5 \mathbf{GDPg}_j + \\ + \beta_6 \mathbf{ln(Infl)}_j + \beta_7 \mathbf{FLFPR}_j + \beta_8 \mathbf{Pop\_g}_j + \beta_9 \mathbf{HDI}_j \qquad (2)$$

where:

k shows which poverty line ($1 or $2) is used, and the subscript *j* refers to a country

Pov(k) is the percentage of population living under the $k poverty line at the time of the survey (the survey years range between 1996 and 2002).

The data for all the independent variables (except corruption index and HDI) are averaged for seven years, starting back from the most recent year for which the poverty data could be obtained.

Aid_pc is the Aid per capita[21] (current US$).

Corr is the corruption "as an obstacle to doing business" index (a manager's general impression of the extent to which corruption is an obstacle to his business), data available for 1999 and 2002; it takes values between 0 and 4 (4 being very high corruption, and 0 no corruption).

DebtR is the external debt to GDP ratio (debt as percentage of GDP).

FDIpc is the Foreign Direct Investment per capita (current US$).

GDPg is the GDP growth rate (percent).

Infl is the Inflation (percent).

FLFPR is the Female Labor Force participation rate (as percent of female population ages 15-64); it takes values from 0 to 100.

Pop_g is the population growth rate.

GDPpc is the GDP per capita.

LifeE is the Life expectancy at birth.

Edu is the Education coefficient of efficiency (ideal years to graduate as a percent of actual as defined by the World Bank WDI); it takes values from 0 to 100 percent.

Health is the Health expenditure as percentage of GDP.

HDI is the Human Development Index; it takes values from 0 to 1.

Most of the basic data on the variables listed above come from the World Development Indicators CD-ROM and are given in Table 1A. The corruption index is taken from a survey conducted by the World Bank in 2000 (World Bank, 2000b) and the human development index and its components from the Human Development Report (UNDP, 2003).

An increase in any of the following variables is expected to reduce poverty: aid per capita, foreign direct investment per capita, GDP growth, GDP per capita, female labor force participation rate, life expectancy, health expenditures, and human development index (HDI).

Economic development brings higher incomes, increased economic capabilities, higher life expectancy, and easier access to health services, reduction of infant mortality, increased access to knowledge and schooling, and it is the primary objective of every nation.

The increase in poverty in the European and Central Asian transition economies is due to the social and economic dislocation of transition that leads to a decrease in output, a sharp drop in governmental revenues and household incomes, and a large increase in income inequality. Still, the poverty in transition economies can be characterized as relatively 'shallow' because the average income of the poor is not substantially below the poverty line (Milanovic 1998, p. 62). The decrease in output was pronounced throughout the region in the first years of the transition; and it was accompanied by a decline in employment for all transition economies (due to a sharp drop in the demand for labor) and by an increase in poverty.

An increase in per capita aid means greater availability of money, goods and services, and more grants, which can help the poor directly or indirectly. However, depending on the amounts received and the nature of aid allocation to different sectors, it may not cause a large decrease in the poverty headcount. The annual data for each country shows that aid per capita increased steadily since 1990. In the first five years, the aid disbursed per capita rose to $30 on average with the exception of Albania where aid per capita was at least $100. In 2001, for most of the countries, the per capita aid varied between $20 and $60.

Another factor of potential significance is foreign direct investment which can add to the physical capital base and create new job opportunities in the country resulting in lower unemployment and a smaller poverty headcount. The annual data for each country show that the FDI per capita increased in the first five years of transition to less than $100, and as time passed the FDI per capita remained under $100 for half of the countries (mostly CIS), but increased to between $100 and $500 per capita for the other half of the countries (mostly CEE).

An increase in GDP is accompanied by overall economic growth and prosperity for a country, therefore less poverty. Studies prove the existence of an inverse relationship between poverty and economic growth, but for growth to have an effect on poverty it has to be noticeable as well (Birdsall and Szekely 2003). Also, the increases in poverty were large in the economies with severe economic declines such as the transition economies of Eastern Europe and Central Asia, and the fastest average growth was associated with the fastest poverty reductions (Easterly 2001). As for the early years of the economic transition process in Eastern Europe and former Soviet Union, by 1995

growth returned to half of the countries, mostly in Eastern Europe and the Baltics (Fisher et al 1996a). The annual GDP growth rates for most countries followed a standard pattern: in the first years of the transition the GDP growth rates were negative, and in the last five years the growth rates are mostly positive and under 9 percent.

The increase in GDP per capita can lead to a significant fall in poverty. When looking at the annual GDP per capita values, in the first five years there is a drop in the GDP per capita in each country except for Hungary and Slovenia. After 1996, most of the CEE countries have an increasing GDP per capita, to more than $2000; but for most of the CIS, the GDP per capita is still decreasing and under $2000.

An increase in life expectancy is another factor that reflects a reduction in the incidence of poverty. People with a longer life can contribute to the economy's output longer and can raise average productivity that makes access to good food, good health, and generally good living conditions more feasible. The first five years of the transition brought constant life expectancy for the countries of CEE and declining life expectancy for the countries of CIS. After 1995, the life expectancy increased in most of the CEE countries and dropped in most of the CIS.

An increase in the female labor force participation rate (the percent of females in the 15-64 age group that are employed) can lead to a sharp decrease in poverty because more women with jobs bring about two breadwinners in a family or a working mother in single mother families, therefore less poverty. Still, there are two problems with this indicator for the transition economies which may lead to unreliable results. First, for the majority of the countries in the sample, the female labor force participation rate was high before 1990 and increased only slightly afterwards. Secondly, this rate is calculated as the

percentage of females of ages 15 to 64 that are employed, but in most of the countries the legal employment age is higher than 15, and the legal retirement age is lower than 64, so the index may be skewed. The female labor force participation rate is slowly increasing over time for all countries. For example, the activity rate rose during the 1990-2002 from 30 to 34.5 percent for Tajikistan, and from 50 to 51.3 percent for Latvia.

An increase in the national health expenditure usually means more resources and better technology being available to the hospitals, pharmacies, and doctors, and easier access to doctors for the population, thereby reducing poverty. For the first five years of the transition, the health expenditure as a percentage of GDP stayed between 2 and 6 percent. Since 1996, however, the ratio has been increasing for some countries and is decreasing for others. Thus, in 2002, the health expenditure ranged more widely, between 2 and 8.5 percent.

An increase in the HDI means higher GDP, higher knowledge and/or higher life expectancy, therefore people in general are better off and fewer are left poor.

On the other hand, an increase in any of the following variables leads to an increase in poverty: debt ratio, inflation, and population growth rate.

An increase in the external debt to GDP ratio implies larger resources used up in debt servicing that could have been put in more productive uses. Such a drag on domestic expenditures can make the country worse off in general, and throw more people in poverty. The annual data on debt-GDP ratio shows an increasing trend for most countries. In the first five years of the transition, the increase in the debt ratio was slower; but in the last years of the sample the increase has turned steeper. The debt ratio was between 5 and

35 percent for most of the countries in 1995, but it shifted up to between 25 and 60 percent for most in 2002.

An increase in inflation tends to raise poverty especially because high inflation rates that most transition economies witnessed in the 1990s also increase the variability of inflation. The future becomes more uncertain, which impinges more on the poor because they lack resources to purchase inflation hedges. Countries with high inflation and little liberalization tend to have negative growth. The first years of the transition brought very high and increasing inflation rates: the greatest values for inflation were during 1992-1994 period (1,967 percent in Belarus, 1,993 percent in Ukraine, 4,107 percent in Armenia). Starting with 1995, the inflation decreased in every country, so that after 1997 most of the countries experienced less than 30 percent inflation rate.

An increase in the population growth rate can be another factor raising the level of poverty. According to the neoclassical growth theory, the faster population growth, holding other things constant, reduces average capital-labor ratio and hence per capita income. In many of the transition economies as well as in poor developing countries, an increase in poverty can result from a higher birth rate in poorer families. When looking at the annual population growth rates for all the countries, the situation is different for the CEE countries than for CIS. In the first five years of the transition, the population growth rate was positive and decreasing for the countries of the CIS, but negative for most of the CEE countries. After 1995, the population growth rate was still negative trending to 0 for most of the CEE countries, but positive and slowly decreasing for most of the countries of CIS.

The degree of corruption can also affect growth and poverty. A higher level of corruption increases the cost of doing business and may significantly add to uncertainty in future prospects of projects. It can directly raise the total cost of public sector projects as well. Similarly, a fall in educational efficiency may reduce the quantity and quality of human capital as well, thereby reducing growth and raising poverty. The effects may not be very clear in a cross section of countries with averaged data, but the regression results may shed some light on such relationships.

Some problems with the nature of relationships among variables might occur partly because of the quality of cross-sectional data used in my research. To the extent possible, these problems will be addressed in Chapter 5.

CHAPTER V

RESULTS

In this chapter, I start with a tabular and graphical analysis of my sample data to understand broad relationships between poverty, income distribution, and other social and economic variables. I follow this analysis with a discussion of results of the econometric model laid out in the previous chapter, which is suitably modified to take care of the data and methodological problems.

5.1 Analysis of Poverty

The transition of the socialist economies to market-oriented economies started in 1990. Massive structural declines and recessions ensued promptly as production was severely disrupted. Most of these countries also experienced high to hyperinflations as the governments sought to alleviate the effects of the precipitous fall in public sector revenue by monetizing budget deficits. While the length of such macro instability varied across countries, it was followed by restrictive macroeconomic policies to contain inflation, which in turn severely weakened the social safety net. The duration of the transition process depended on each country's initial conditions, subsequent domestic shocks to the economy, external environment, and economic policies. As time passed, the expenditure reducing policies resulted in varying segments of the population across countries becoming poor. As explained in earlier chapters, a major problem of the social safety net was that the social protection reform went slower than the dynamics of the new economic environment. The new governments had the mission to promote economic

growth by developing competitive labor markets, building new institutions, and developing public and private pension systems. The pay-as-you-go pension system was becoming unsustainable[22].

The result of the new programs and policies was that, by 1998, one in five people in the transition countries of Europe survived on less than $2 per day. Less than 4 percent of the population had lived under the $2 poverty line only 10 years earlier. The zero poverty target during the communist regime was achievable because of free health care, free child care, free education, high labor force participation for women and subsidization of the items of basic consumption needs. The increase in poverty in the 1990s was much larger and more persistent than most had expected at the start of the transition process. Poland is a very good example: poverty peaked in 1994, and as the economy rebounded, poverty rates declined although they were still higher in 1998 than in 1991.

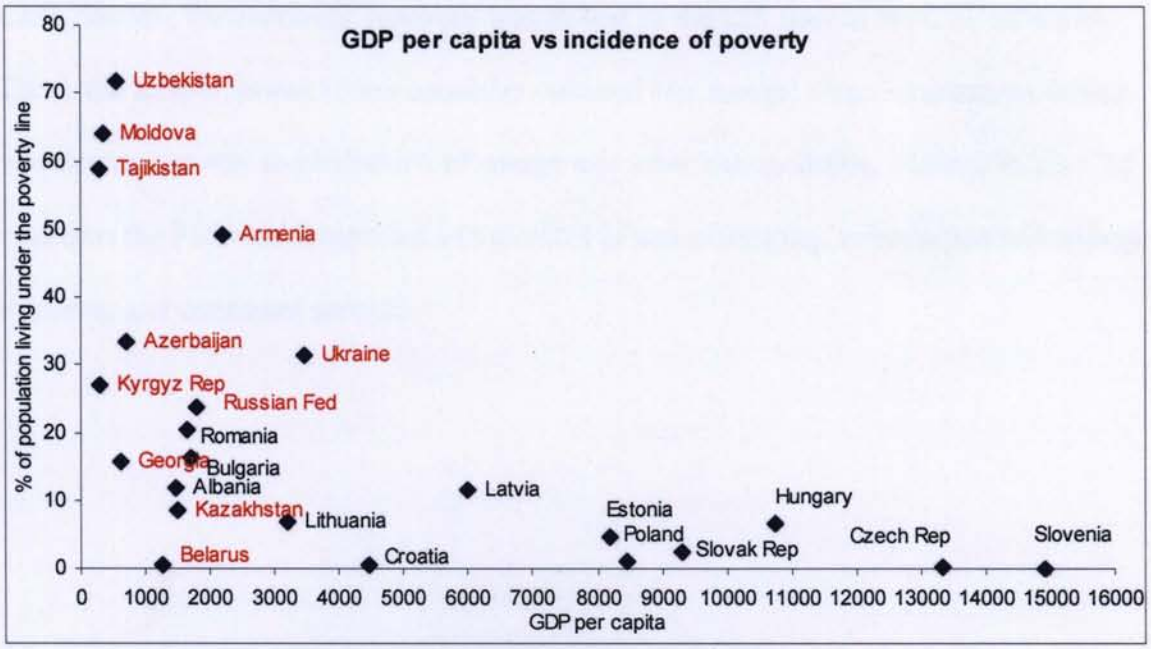

Figure 1: GDP per capita vs. incidence of poverty

As can be seen from Figure 1, which shows poverty headcount against GDP per capita, the incidence of poverty ranges from 71.7 percent of population in the poor country of Uzbekistan to under one percent in the relatively rich countries such as Czech Republic and Slovenia.

Moreover, the Commonwealth of Independent States (shown in red in Figure 1) are concentrated in the area of high poverty and low GDP (under $3500 per capita), with only Kazakhstan and Belarus having less than 10 percent of the population living under the poverty line. Most of the CEE countries already have less than 10 percent of the population living under the poverty line and a higher GDP per capita, with only Albania, Bulgaria, Lithuania and Romania showing a lower GDP per capita and higher poverty.

These differences between the CIS and CEE countries could be explained by several factors. First, the economic decline was deeper in the former Soviet Union than in CEE. Second, the economic recovery was slower in the CIS than in the CEE countries. Third, the former Soviet Union countries received less foreign direct investment, which was devoted mostly to production of energy and other commodities, whereas in the CEE countries the FDI was diversified and directed at manufacturing, information technology, business, and consumer services.

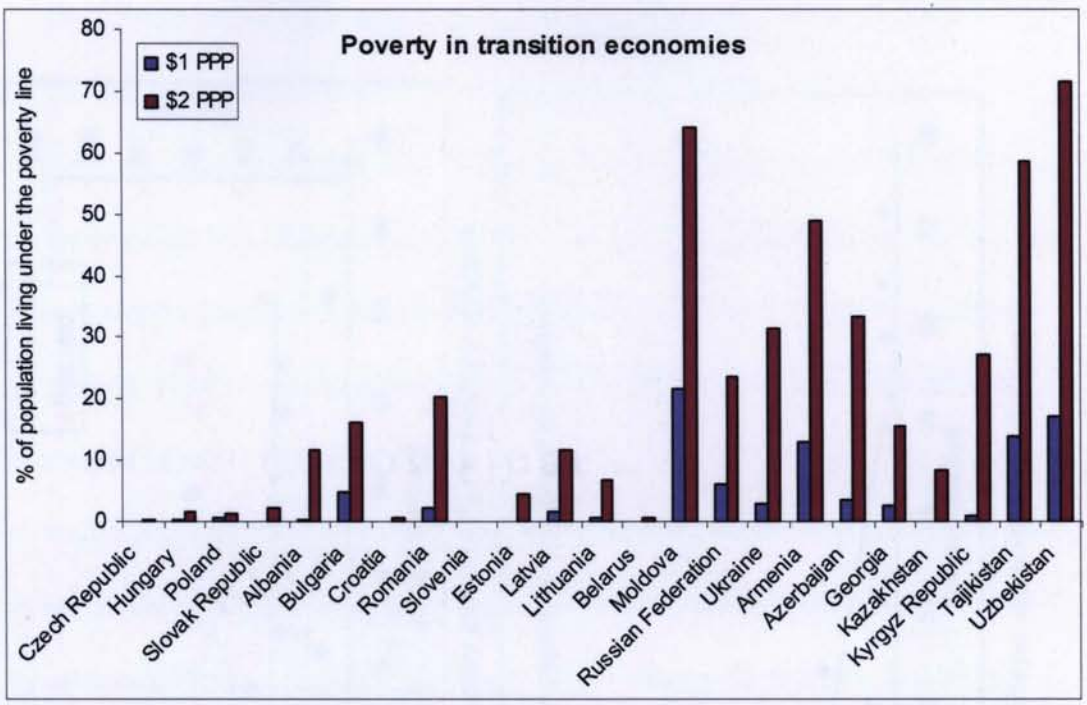

Figure 2: Poverty in transition economies of Europe and Central Asia, selected countries

As shown in Figure 2, there are significant difference samong transition countries in the percentage of population living under the poverty lines. For the $1 line, the headcount varies from less than 0.2 percent for Belarus, Croatia, Czech Republic, Estonia, Kazakhstan, Slovak Republic and Slovenia, to 21 percent for Moldova and 17 percent for Uzbekistan. When measured against $2 poverty line, the number of poor people varies from less then 1 percent for Belarus, Czech Republic, Croatia and Slovenia, to a very high 64 percent for Moldova and 71 percent for Uzbekistan. It is likely that for most countries increasing poverty resulted not only from growth slowdowns or negative growth but also from a deterioration of income distribution.

5.1.1 Poverty trends as related to socioeconomic indicators

Table 1. External sector variables (aid per capita, debt ratio, debt per capita) and $2 poverty

Country	Aid pc ($)	Debt ratio	Debt pc ($)	$2 PPP
Albania	84.98	20.76	305.06	11.81
Armenia	61.09	42.22	210.67	48.99
Azerbaijan	27.87	18.12	127.66	33.41
Belarus	3.96	8.92	113.51	0.68
Bulgaria	43.73	72.84	1247.61	16.2
Croatia	25.68	48.34	2155.62	0.53
Czech Rep.	12.50	34.86	1957.39	0.23
Estonia	65.64	56.24	2017.51	4.69
Georgia	55.46	51.64	316.25	15.7
Hungary	23.76	60.17	2799.09	1.52
Kazakhstan	9.95	26.02	386.97	8.45
Kyrgyz Rep.	37.96	111.41	342.93	27.17
Latvia	40.64	38.24	950.09	11.52
Lithuania	28.24	32.08	1022.33	6.9
Moldova	27.91	63.76	220.91	64.05
Poland	30.68	34.97	1403.95	1.18
Romania	19.26	25.41	417.50	20.47
Russian Fed.	10.75	67.00	1195.01	23.76
Slovak Rep.	18.33	31.00	1147.11	2.41
Slovenia	21.19	47.14	4657.07	0.06
Tajikistan	26.21	60.20	175.08	58.67
Ukraine	11.40	36.57	283.01	31.37
Uzbekistan	7.51	33.23	184.81	71.71

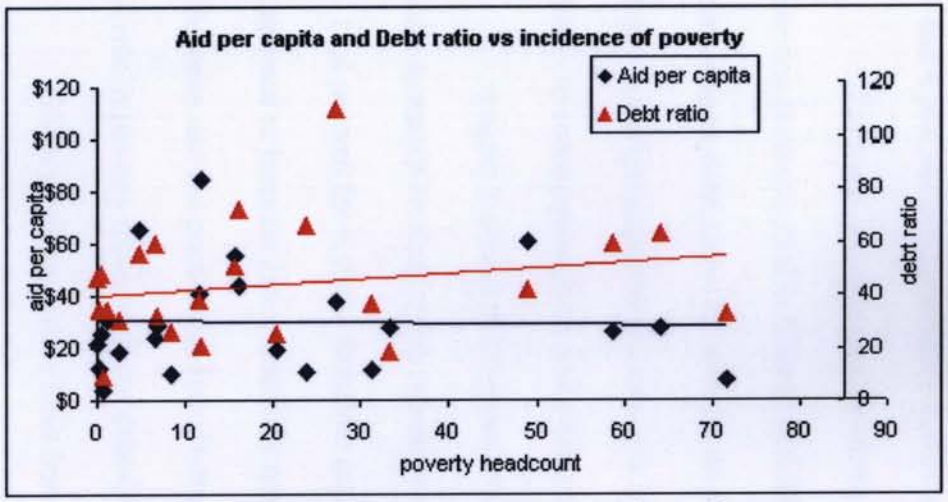

Figure 3. Aid per capita and debt ratio vs. incidence of poverty

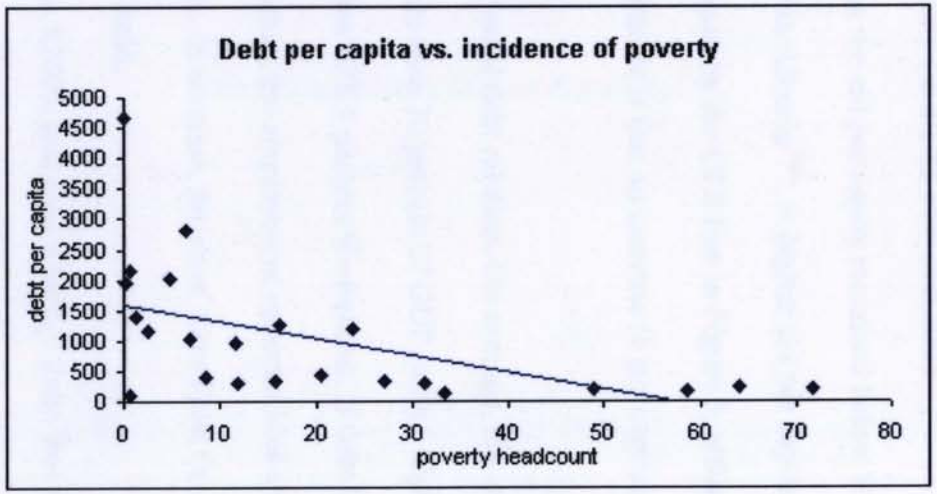

Figure 4. Debt per capita vs. incidence of poverty

The aid per capita, debt ratio and the debt per capita are shown in Table 1. Figures 3 and 4 plot the same variables against poverty (at the $2 PPP standard).

For most of the transition economies the aid per capita remained below $50, varying between $3.9 in Belarus and $84.9 in Albania[xxiii]. A higher aid per capita does not seem to correlate with poverty, as depicted by the OLS line in Figure 3, although there is a slight negative relation. My hypothesis is that an increase in per capita aid is likely to reduce poverty to some extent.

Figure 3 also shows the poverty-external debt relation. On average, the external debt in transition economies represents more than 30 percent of GDP, with a high of 111.4 percent for Kyrgyz Republic and a low of 8.9 percent for Belarus. If debt is incurred to increase labor-intensive production, the employment opportunities should improve and the poor could benefit directly. In contrast, the chart shows just the opposite: a rise in poverty along with the debt-GDP ratio.

Most of the countries have less than $2000, and over a half of them less than $1000, of per capita external debt. Tajikistan is the most, and Bulgaria is the least indebted country with per capita debts of $4657 and $113.5, respectively. Economic theory is not entirely clear about the debt-poverty relation except for the highly indebted economies where debt servicing obligations can impinge strongly on growth and poverty reduction programs. From the scatter plot in Figure 4, we find a negative simple correlation between debt and poverty. If the sample countries have a large enough absorptive capacity to put their external debt to productive uses, then debt accumulation and poverty reduction could indeed go together, as indicated by Figure 4.

Table 2. External sector variables (FDI per capita, export ratio, trade ratio) and $2 poverty

Country	FDI pc ($)	Export ratio	Trade ratio	$2 PPP
Albania	64.88	19.67	39.38	11.81
Armenia	58.18	19.00	71.84	48.99
Azerbaijan	27.91	42.42	71.44	33.41
Belarus	11.87	69.21	125.89	0.68
Bulgaria	87.44	55.69	97.10	16.2
Croatia	345.10	48.46	62.70	0.53
Czech Rep.	124.15	52.87	112.13	0.23
Estonia	400.42	79.90	170.27	4.69
Georgia	30.55	22.99	32.82	15.7
Hungary	201.41	50.62	103.53	1.52
Kazakhstan	185.49	46.82	67.04	8.45
Kyrgyz Rep.	1.01	36.72	61.63	27.17
Latvia	145.76	51.30	116.12	11.52
Lithuania	108.07	45.72	81.89	6.9
Moldova	21.90	49.97	99.12	64.05
Poland	188.08	26.12	58.60	1.18
Romania	45.69	33.01	63.48	20.47
Russian Fed.	18.65	44.51	57.95	23.76
Slovak Rep.	56.74	55.22	122.01	2.41
Slovenia	108.70	56.57	114.63	0.06
Tajikistan	4.09	49.86	107.48	58.67
Ukraine	9.93	52.75	104.43	31.37
Uzbekistan	2.95	24.59	45.13	71.71

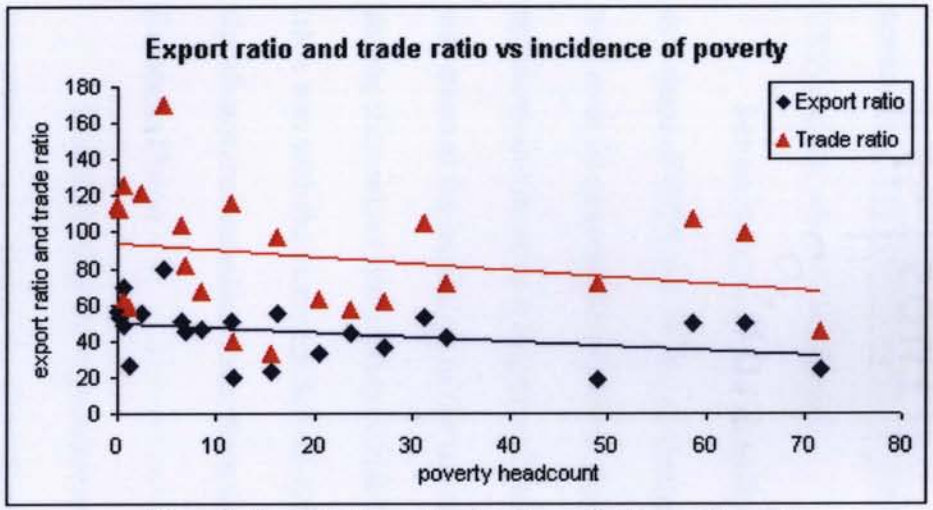

Figure 5. Export ratio and trade ratio vs. incidence of poverty

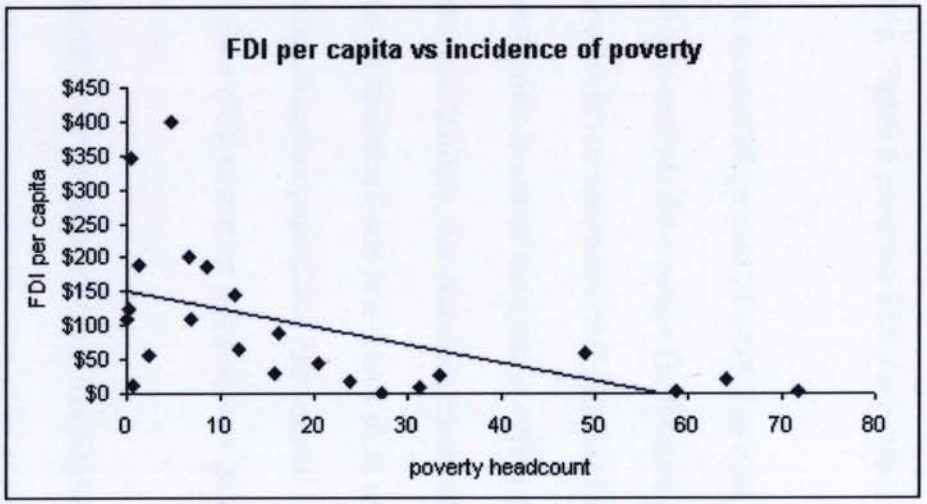

Figure 6. FDI per capita vs. incidence of poverty

Table 2 shows foreign direct investment per capita, the export ratio and the trade ratio among these transition economies. The export ratio and trade ratio are plotted against the $2 PPP headcount in Figure 5. Then, Figure 6 plots the FDI per capita (current US$) and the poverty headcount.

For all countries in the sample, exports exceed 19 percent of GDP. For total trade as a share of GDP, the lowest in Georgia at 33 percent; yet the average for the group is well over 50 percent. As expected, the simple correlation between either measure of openness and poverty is negative. Trade liberalization is one of the areas in which action was taken at the beginning of the transition process. Initially, the countries traded mostly among themselves (the former Soviet bloc and its satellites), and less than a third of their trade was with the European Union. Over the last fourteen years there had been a significant reorientation, about three fourths of the CEE countries' exports now go to the European Union.

It is likely that the expansion and regional diversification of trade has played an important role in raising the allocative efficiency of resources in the emerging market economies. Competition with international producers and the adoption of better technology may have had an important bearing on growth.

Most of the countries in the sample have attracted less than $150 of foreign direct investment per capita, with Estonia leading the group with $400, and Kyrgyz standing at the bottom with only $1. Most FDI in the former Soviet states is devoted to the production of energy whereas the CEE countries receive much of FDI in manufacturing, information technology, and business and consumer services.

A strong infusion of FDI can bring about a sustainable productivity growth which could contribute to a decrease in poverty. As Figure 6 shows, an increase in FDI is indeed correlated with a decrease in poverty.

The GDP growth, the population growth, and the investment to GDP ratio are shown below in Table 3. The scatter plot and the line showing a simple correlation with poverty appear in Figures 7 and 8. Most of the countries in the sample have a GDP growth rate over 3.8 percent. The exceptions are Ukraine, with a negative growth, and Romania with a growth of 0.6 percent. The relation between growth and poverty is positive but very weak as shown by the blue line in Figure 7.

The same is true of the relationship between population growth and poverty. Half the countries in the sample have, however, declining populations, and only in Uzbekistan population is growing at over one percent a year.

Neoclassical growth theory indicates a strong link between investment and income as countries move toward their steady state. If per capita income and poverty are negatively related, then a higher investment ratio should correlate with lower poverty through the income channel. Except for Tajikistan, all countries have an investment ratio higher than 15 percent, with Czech and Slovak Republics leading the group with 31.9 and 32.2 percent respectively. The correlation is strong and negative, as the investment ratio increases, the poverty headcount decreases.

Table 3. GDP growth, population growth, investment ratio and $2 poverty line

Country	GDP growth	Pop. growth	Investment ratio	$2 PPP
Albania	4.70	0.97	22.00	11.81
Armenia	7.34	0.16	16.22	48.99
Azerbaijan	9.88	0.84	22.88	33.41
Belarus	5.80	-0.35	25.20	0.68
Bulgaria	4.00	-0.70	18.23	16.2
Croatia	3.77	-0.09	22.49	0.53
Czech Rep.	4.82	-0.15	31.95	0.23
Estonia	4.60	-0.76	29.59	4.69
Georgia	4.70	0.18	19.69	15.7
Hungary	4.86	-0.46	23.64	1.52
Kazakhstan	13.47	-0.68	23.73	8.45
Kyrgyz Rep.	5.33	0.98	17.02	27.17
Latvia	4.76	-0.83	27.27	11.52
Lithuania	3.98	-0.69	18.84	6.9
Moldova	6.07	-0.35	13.54	64.05
Poland	4.10	-0.03	24.01	1.18
Romania	0.60	-0.12	18.90	20.47
Russian Fed.	9.00	-0.55	16.86	23.76
Slovak Rep.	6.21	0.21	32.24	2.41
Slovenia	3.80	0.15	24.84	0.06
Tajikistan	5.30	0.54	10.83	58.67
Ukraine	-0.20	-0.81	19.27	31.37
Uzbekistan	3.80	1.29	16.35	71.71

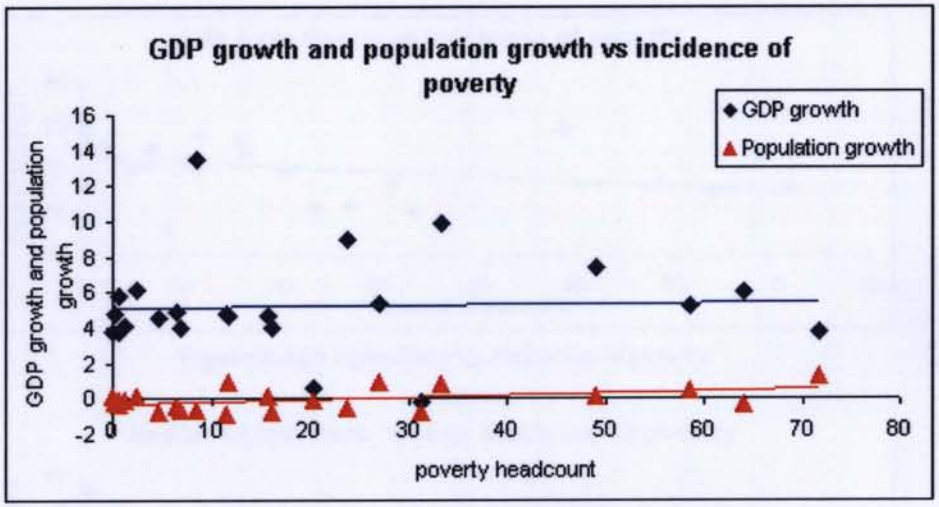

Figure 7. GDP growth and population growth vs. incidence of poverty

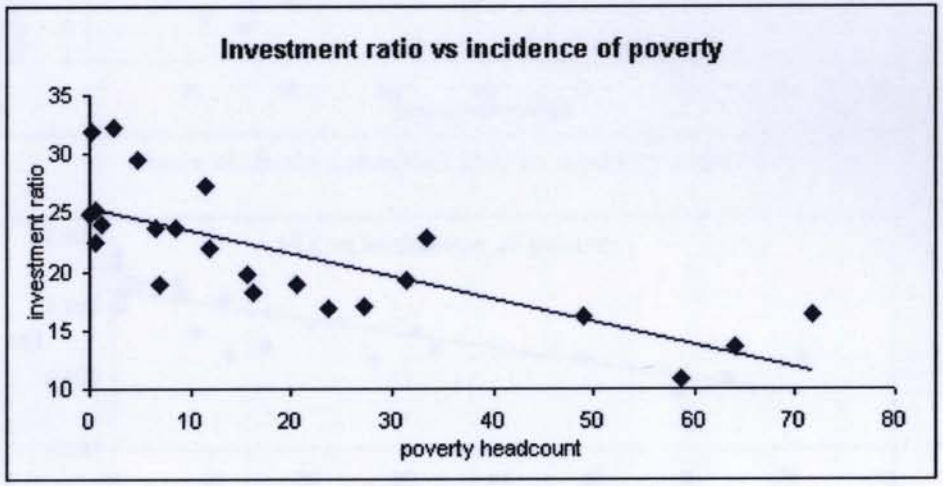

Figure 8. Investment ratio vs. incidence of poverty

Table 4. Human development indicators (HDI, life expectancy, health expenditure ratio) and the $2 poverty headcount.

Country	HDI	Life Expect.	Health Exp. r.	$2 PPP
Albania	0.735	73.99	3.47	11.81
Armenia	0.729	74.36	7.80	48.99
Azerbaijan	0.744	65.21	1.97	33.41
Belarus	0.804	68.01	6.12	0.68
Bulgaria	0.795	71.68	4.23	16.2
Croatia	0.818	73.54	10.20	0.53
Czech Rep.	0.861	73.77	6.34	0.23
Estonia	0.833	69.79	6.18	4.69
Georgia	0.746	73.19	2.90	15.7
Hungary	0.837	70.55	7.40	1.52
Kazakhstan	0.765	62.95	4.60	8.45
Kyrgyz Rep.	0.727	65.83	4.30	27.17
Latvia	0.811	69.66	5.70	11.52
Lithuania	0.824	72.62	5.46	6.9
Moldova	0.700	67.23	8.08	64.05
Poland	0.841	73.04	6.07	1.18
Romania	0.773	69.86	4.32	20.47
Russian Fed.	0.779	65.34	4.62	23.76
Slovak Rep.	0.836	72.65	6.31	2.41
Slovenia	0.881	74.77	7.63	0.06
Tajikistan	0.677	68.64	6.60	58.67
Ukraine	0.766	68.22	5.30	31.37
Uzbekistan	0.729	67.85	4.47	71.71

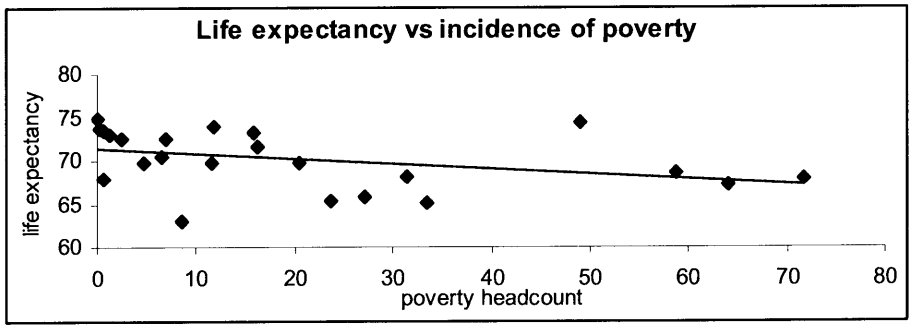

Figure 9. Life expectancy vs. incidence of poverty

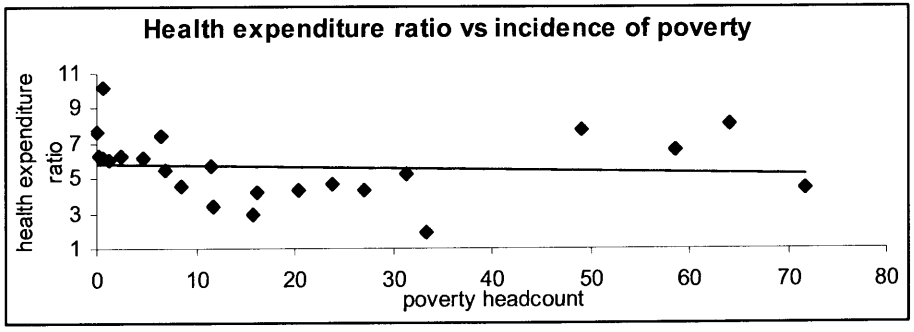

Figure 10. Health expenditure ratio vs. incidence of poverty

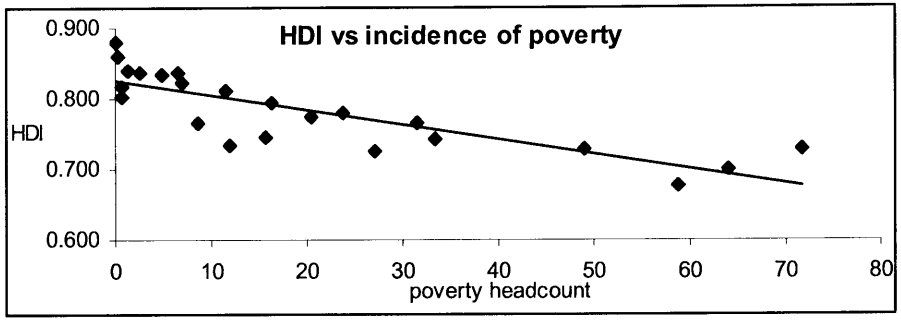

Figure 11. HDI vs. incidence of poverty

5.1.2. Poverty trends as related to human development indicators

Human development, life expectancy and the health expenditure ratio are shown in Table 4. Figures 9, 10, and 11 plot the poverty headcount against life expectancy, health expenditure to GDP ratio, and human development index (HDI) respectively.

For all the countries in the sample, the life expectancy is relatively high, between 62 and 75 years. Unlike income levels, life expectancy is one of the factors for which the former Soviet states (at less than 70 years) do not lag too far behind the CEE countries (slightly over 70 years). The line showing simple correlation with poverty is slightly downward sloping. Thus, a higher life expectancy is associated with falling poverty. On the other hand, health expenditure line is virtually flat implying that it is not much related with poverty, though the ratio to GDP ranges widely between 1.9 percent for Azerbaijan and 10.2 percent for Croatia.

More importantly, when we add PPP-adjusted income to health and education indicators, we get HDI, which is in the middle to high range (higher than 0.700) for all countries, except Tajikistan. Compared to income per capita, HDI looks better for the sample countries because of non-income indicators of the quality of life included in HDI. The old tradition of providing free health and education continues to have a significant impact on human development in the countries of our inquiry. We observe from Figure 11 that even a very small increase in HDI is associated with a noticeable decrease in poverty.

5.2. Analysis of Income Distribution

Europe and Central Asia entered the transition process with some of the lowest levels of inequality in the world. As the role of the market increased, however, the state support to its population in terms of income security declined rapidly. The disappearance of guaranteed employment and pension led to a quick worsening of income distribution together with a rise in poverty. This was only accentuated by a severe decompression of wages at both the high and low ends.

Table 5. Gini coefficient, cumulative income percentile, poverty, per capita income (used for Figures 12 through 15), Kuznets ratio, and Coefficient of variation

	Cumulative income percentile				Rich 20%		$2	GNI per	Kuznets	
Country	20%	40%	60%	80%	pop	GINI	PPP	capita	ratio[24]	CVE[25]
Albania	9.09	22.54	39.81	62.61	37.39	28.17	11.81	1380	2.47	21.37
Armenia	6.65	17.92	33.33	54.93	65.07	37.9	48.99	560	4.46	23.28
Azerbaijan	7.43	18.96	34.27	55.5	44.5	36.5	33.41	650	3.97	23.06
Belarus	8.44	21.43	38.39	60.91	39.09	30.4	0.68	1380	2.86	21.76
Bulgaria	6.74	19.81	37.68	61.11	38.89	31.95	16.2	1670	3.51	21.91
Croatia	8.26	21.04	37.81	60.4	39.6	30.5	0.53	4410	2.96	21.90
Czech Rep	10.21	24.63	42.05	63.66	36.34	25.4	0.23	5160	2.22	21.01
Estonia	6.05	16.43	30.95	51.88	48.12	41.56	4.69	3780	5.48	24.14
Georgia	6.37	17.74	33.81	56.38	43.62	36.95	15.70	600	4.38	23.00
Hungary	9.91	24.62	42.95	65.58	34.62	24.4	1.52	4480	2.07	20.74
Kazakhstan	8.18	20.7	37.47	60.41	39.59	31.35	8.45	1340	2.96	21.92
Kyrgyz Rep	9.12	22.27	39.13	61.65	38.35	29.02	27.17	280	2.55	21.55
Latvia	7.57	20.49	37.6	59.72	60.28	32.37	11.52	2430	3.42	22.06
Lithuania	7.87	20.53	37.46	60.02	39.98	31.88	6.9	3110	3.17	22.01
Moldova	7.1	18.64	34.37	56.31	43.69	35.32	64.05	400	4.01	22.92
Poland	7.79	20.68	37.72	59.89	40.11	31.6	1.18	3860	3.09	22.01
Romania	8.16	21.23	38.62	61.54	38.46	30.04	20.47	1680	2.89	21.67
Russian Fed	4.89	14.39	28.46	48.73	51.27	45.19	23.76	1690	7.37	25.13
Slovak Rep	8.75	23.62	42.36	65.18	34.82	25.28	2.41	4000	2.39	20.91
Slovenia	9.09	22.59	39.68	62.23	37.77	28.4	0.06	9720	2.5	21.43
Tajikistan	8.05	20.93	37.95	60.02	39.98	34.7	58.67	180	3.13	21.96
Ukraine	8.82	22.16	39.5	62.2	37.8	29	31.37	760	2.63	21.48
Uzbekistan	9.16	23.25	41.12	63.67	36.33	26.8	71.71	620	2.41	21.15

Figure 12 shows the distribution of income shares of the poorest 40 percent of population (blue diamonds on the graph) and of the richest 20 percent (red squares) for the twenty three countries, arranged in order of increasing per capita income. On average,

the richest 20 percent hold twice the income share of the poorest 40 percent. In addition, from Figure 12, we can visualize for the richer group a slightly rising trend up to around $2,500 of national per capita income and then a gradually falling trend. For the bottom 40 percent of the population, however, just the opposite relation, albeit shallower, is noticeable. Together, the data therefore shows a rising inequality as we move from very poor to less poor countries and after some point the inequality begins to fall. This seems to support Kuznets' inverted-U hypothesis except that the relation remains very weak at best.

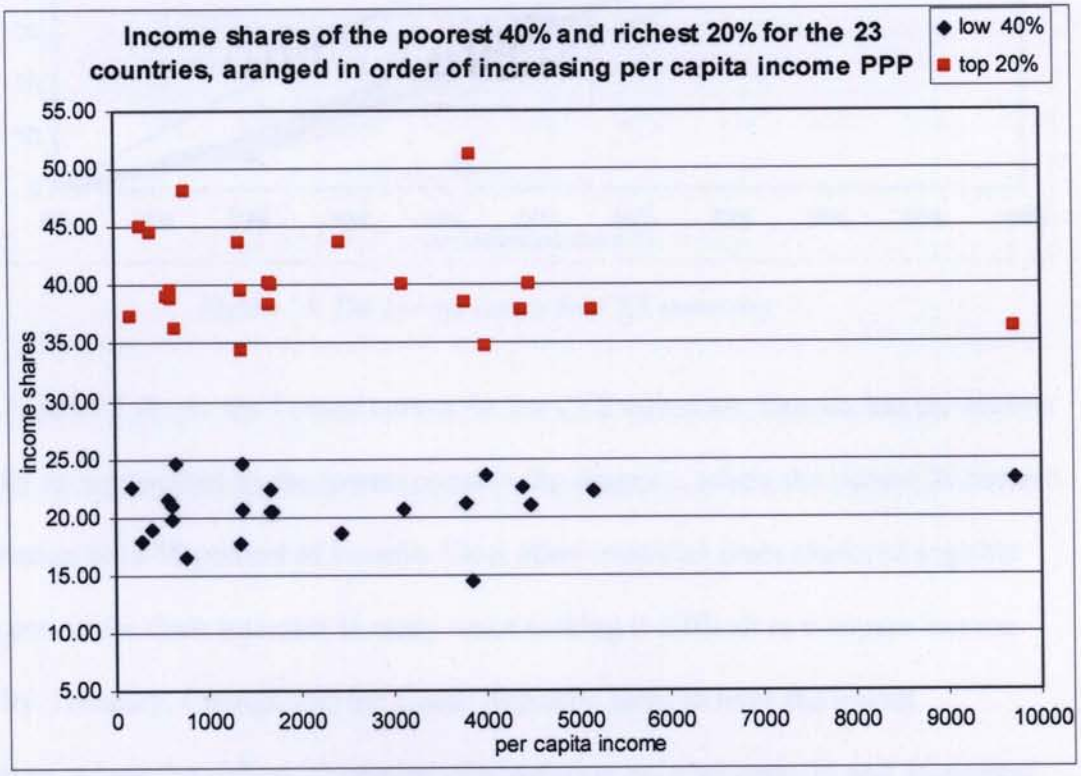

Figure 12: Income shares of the poorest 40 percent of population and the richest 20 percent of population for Europe and Central Asia, arranged in order of increasing per capita income PPP.

Next, Lorenz curves are shown in Figures 13 and 14. The curves relate cumulative shares of income earned by cumulatively increasing fractions of the population, arranged from the poorest to richest.

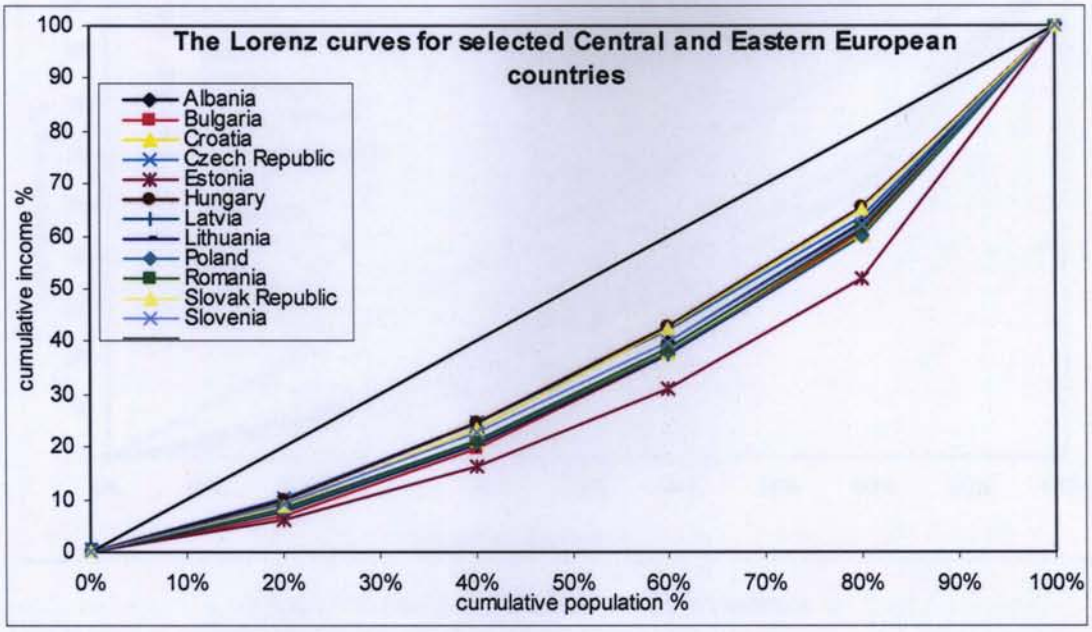

Figure 13. The Lorenz curves for CEE countries

Figure 13 shows the Lorenz curves for the CEE countries. Estonia has the highest inequality as represented by the lowest curve in the diagram, where the richest 20 percent of population hold 48 percent of income. Most other countries seem clustered together and the curves for them intersect in many cases making it difficult to compare income inequality. Hungary, Croatia, and the Czech Republic seem to have the lowest inequalities, where the richest 20 percent of population hold between 34 and 36 percent of income. Also, these countries have the smallest incidence of poverty.

Figure 14 shows the Lorenz curves for the CIS countries. Russia has the highest inequality, where the richest 20 percent of population hold 51 percent of the income. A cluster of four countries then follows with a lower inequality: Armenia, Moldova,

Azerbaijan, and Georgia. Their curves also, however, intersect precluding an accurate ordering of countries by inequality.

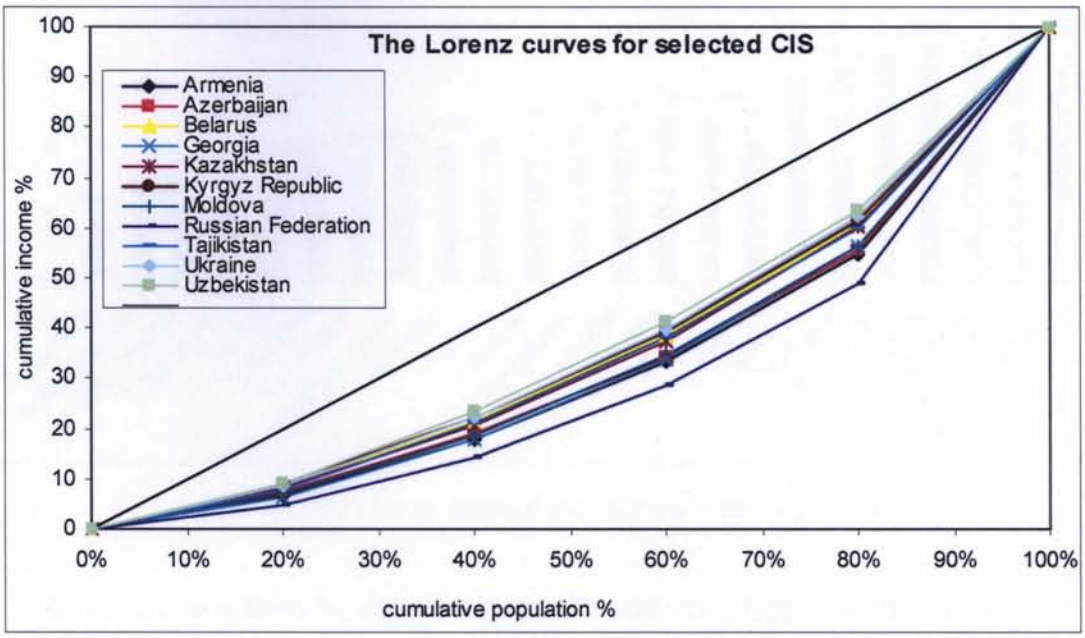

Figure 14. The Lorenz curves for CIS countries

A summary measure of inequality can avoid the comparability problem associated with Lorenz curves. Such a measure is Gini coefficient which is shown in Figure 15. The countries are ordered from lowest (Hungary) to highest (Russia) level of inequality.

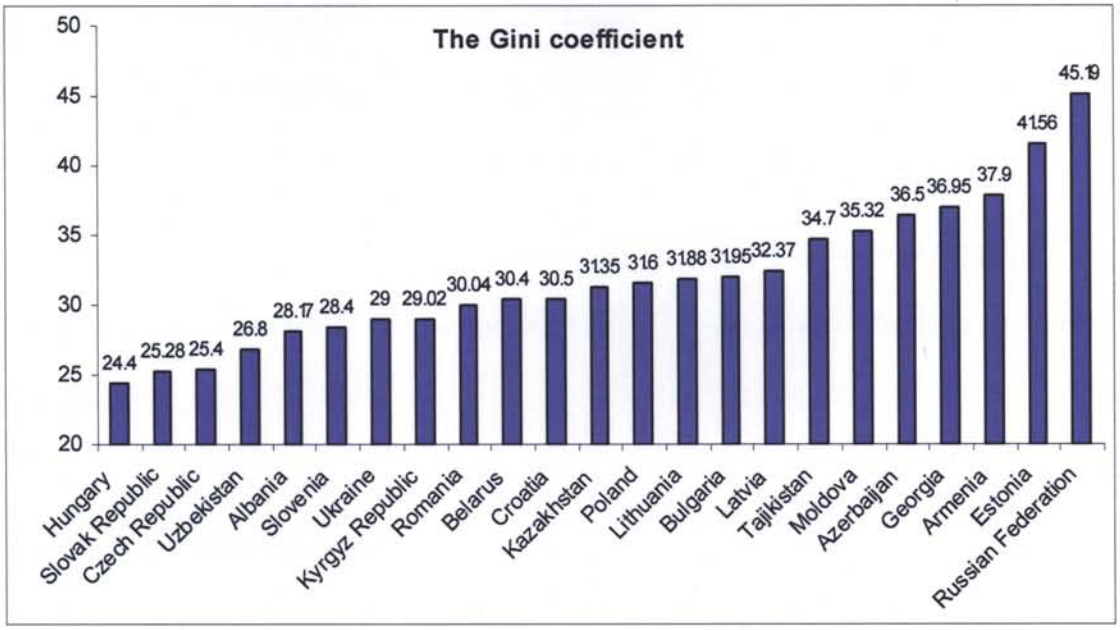

Figure 15. The income inequality as per the Gini coefficient

As can be seen from Figure 15, only three countries – Hungary, the Slovak Republic and the Czech Republic – have Gini around 0.25. Inequality then rises up to 0.32 for 13 other countries and reaches a maximum of 0.46 for Russia followed by Estonia with 0.42.

I also calculated other measures of income inequality, such as the coefficient of variation and various Kuznets ratios (Table 5), but the conclusion remains the same: income inequality and poverty tend to go together in the transition economies.

5.3 Econometric Results

To study the effect of different macroeconomic indicators on poverty, I find two approaches helpful. The first approach is to regress poverty on growth-related variables together with multiple indicators of human development, using Equation 1.

The second approach is to regress poverty on the same growth factors and a single composite human development index, using Equation 2. This will be relevant if the specific components of HDI are not as important separately in explaining poverty.

For three of the explanatory variables (foreign direct investment per capita, inflation, and GDP per capita) I use logarithmic scale because these variables are growing exponentially.

5.3.1. The Regression Equations

The regression results for Equations 1 and 2, for $1 and $2 poverty lines (Pov1 and Pov2 respectively) are shown below in Table 6. Columns 1 and 2 show the results for Pov1, and columns 3 and 4 for Pov2.

Table 6: Regression results for equations 1 and 2

	Eq.1, Pov1 (1)	Eq.2, Pov1 (2)	Eq.1, Pov2 (3)	Eq.2, Pov2 (4)
Aid_pc	-0.06	-0.11	-0.02	-0.20
	(-0.65)	(-1.47)	(-0.09)	(-1.08)
Corr	-4.69	-5.88	-8.10	-12.56
	(-0.55)	(-1.37)	(-0.38)	(-1.18)
DebtR	0.006	0.02	0.14	0.10
	(0.07)	(0.42)	(0.68)	(0.78)
Ln(FDIpc)	-1.58	0.59	-1.81	1.42
	(-0.59)	(0.33)	(-0.27)	(0.32)
GDPg	0.053	-0.17	-2.53	-2.04*
	(0.07)	(-0.34)	(-1.37)	(-1.64)
Ln(Infl)	-0.43	-0.84	0.07	-0.35
	(-0.20)	(-0.65)	(0.01)	(-0.11)
FLFPR	0.52	0.91**	-0.76	0.78
	(0.88)	(2.02)	(-0.50)	(0.69)
Pop_g	1.25	4.27*	4.79	10.97*
	(0.27)	(1.68)	(0.42)	(1.74)
Ln(GDPpc)	-5.35*		-12.18	
	(-1.61)		(-1.46)	
Life	0.33		0.001	
	(0.31)		(0.00)	
Edu	0.08		1.19	
	(0.13)		(0.83)	
Health	0.90		-0.27	
	(0.93)		(-0.11)	
HDI		-124.59***		-332.77***
		(-3.31)		(-3.57)
intercept	3.88	77.89	53.82	275.23
	(0.06)	(2.45)	(0.35)	(3.49)
No. of obs	23	23	23	23
R-squared	0.61	0.69	0.78	0.83
Adj. R-squared	0.14	0.47	0.52	0.71
S.E.E.	372.21	294.32	2357.87	1812.07

The numbers in parentheses are t-ratios.
* Significant at 10%
** Significant at 5%
*** Significant at 1%

In Equation 1, we find none of the coefficients to be statistically significant at 1 or 5 percent level. Some of the coefficients also have unexpected signs. Per capita GDP is the only variable that is significant at 10 percent level. Its coefficient of -5.35 seems on

the higher side, indicating that a one percent increase in per capita income leads to a 5 percent reduction in poverty (such as from 20 percent to 19 percent).

If we substitute overall HDI for income, life expectancy, and health and education variables, the results improve to some extent as shown in Equation 2. The HDI variable is highly significant at the 1 percent level. For instance, an HDI improvement of 0.01, such as from .75 to .76, is associated with a 1.25 point reduction in poverty which looks much more plausible.

Population growth is positively and significantly (at 10 percent) related to poverty, as well. This corresponds to the neoclassical growth theory. As mentioned earlier, however, most of the transition countries have well under one percent growth of population. Hence, population control may not be highly important as a factor in programs of poverty alleviation in these countries.

Other variables continue to remain insignificant. When we move to the $2 poverty line, a much more relevant indicator of poverty in the sample countries, the overall fit of the equation improves substantially. In equation 3, the adjusted R-squared increases from 0.14 to 0.52, and in equation 4, it rises from 0.47 to 0.71. However, not much change occurs in the significance of individual coefficients. HDI continues to be highly significant (equation 4).

5.3.2. Possible Problems with the Data.

Multicollinearity

A concern with the results in Table 6 is that low t-ratios, together with relatively high R-squared, may indicate the presence of multicollinearity. A substantial difference

between R-squared and adjusted R-squared could also mean that the model has too many independent variables some of which may have reduced the explanatory power of the model.

One problem that needs to be addressed in a model with numerous independent variables is multicollinearity. Multicollinearity biases upward the standard errors of the regression coefficients, widens the confidence interval, and reduces the reliability of the sample coefficients as estimates of the population parameters. Moreover, it can reduce the residual variance and increase the explanatory power of the model. The results will then be unreliable.

To get a handle on these problems, I construct the correlation matrix and the scatter plot matrices, as shown in Table 4A and Figure 1A, respectively.

In Figure 1A, there are three independent variables (aid per capita, female labor force participation rate, and life expectancy) that seem to be relatively highly correlated with several independent variables. To see if multicollinearity needs to be corrected for, a correlation matrix is shown in Table 4A.

As in the scatter plots, aid per capita, female labor force activity rate and life expectancy are more highly correlated with some of the independent variables than they are with the dependent variable, indicating the presence of multicollinearity. I therefore exclude these variables from the regression equations. Since there is a big difference between R-squared and adjusted R-squared, eliminating selected independent variables from the regression should improve the explanatory power of the remaining variables as well.

Correcting for multicollinearity

After dropping aid per capita, female labor force participation rate, and life expectancy from Equation 1, and the first two of these from Equation 2, the results shown in Table 7 emerge:

Table 7. Regression results for the restricted model

	Eq.1, Pov1 (5)	Eq.2, Pov1 (6)	Eq.1, Pov2 (7)	Eq.2, Pov2 (8)
Corr	-3.21	-7.37*	-10.55	-17.20*
	(-0.63)	(-1.82)	(-0.85)	(-1.90)
DebtR	0.02	0.02	0.11	0.09
	(0.32)	(0.29)	(0.65)	(0.69)
Ln(FDIpc)	-1.28	-0.59	-2.57	-0.79
	(-0.71)	(-0.34)	(-0.58)	(-0.21)
GDPg	-0.24	-0.61	-2.20	-2.54**
	(-0.40)	(-1.24)	(-1.51)	(-2.31)
Ln(Infl)	-0.14	-1.07	-0.34	-1.09
	(-0.08)	(-0.80)	(-0.08)	(-0.36)
Pop_g	0.62	1.16	5.92	7.21
	(0.25)	(0.52)	(0.96)	(1.45)
Ln(GDPpc)	-3.61*		-13.80**	
	(-1.70)		(-2.65)	
Edu	0.35		0.98	
	(0.82)		(0.94)	
Health	0.79		-0.06	
	(0.97)		(-0.03)	
HDI		-82.06**		-293.74***
		(-2.41)		(-3.86)
Intercept	4.21	91.33	59.76	296.44
	(0.08)	(2.74)	(0.44)	(3.98)
No. of obs	23	23	23	23
R-squared	0.57	0.58	0.78	0.82
Adj. R-squared	0.27	0.39	0.62	0.73
S.E.E.	407.51	396.08	2447.58	1984.04
Chi - square	14.14	13.12	7.08	8.34

* Significant at 10%
** Significant at 5%
*** Significant at 1%

The results in Table 7 do not show much improvement in the fit of the model compared to Table 6. Only the adjusted R^2 for Pov1 equation is noticeably higher. The

Pov2 equations continue to perform better than Pov1 equations. When HDI substitutes for disaggregated social indicators, it retains the negative sign and high significance for its coefficient. The insignificant variables in Table 6 do not acquire higher significance in Table 7 either.

Heteroscedasticity

Heteroscedasticity often occurs in data sets that exhibit a large disparity between the largest and the smallest observed values, such as the average GDP per capita that varies between $160 for Tajikistan and $8270 for Slovenia, and the average inflation that takes values between 5 percent for Croatia and 689 percent for Ukraine. The larger the disparity between the size of observations in a sample, the larger the likelihood that the error term observations associated with them will have different variances and therefore be heteroscedastic.

To test for heteroscedasticity, I perform the Breusch-Pagan test. If the calculated value of chi-squared is greater than its tabular value, then the null hypothesis of homoscedasticity is rejected and the heteroscedasticity is present. The test shows that for all the equations, the calculated chi-squared is much higher than the tabular value at 95 percent probability, therefore the null hypothesis of constant variance is rejected.

Correcting for heteroscedasticity

One way to correct for heteroscedasticity is to use logarithm or square root for the dependent variable. I used different methods to correct for heteroscedasticity in the four equations because, by using either the logarithm or the square root for all four cases, the

heteroscedasticity is still present in half of the cases. I settle with the logarithm of the dependent variable in both the versions of Pov1 equation, and the square root of the dependent variable in the two versions of Pov2 equations. The new regression equations can be seen below:

$$\mathbf{Ln[Pov(1)]}_j = \alpha_0 + \alpha_1 \mathbf{Corr}_j + \alpha_2 \mathbf{DebtR}_j + \alpha_3 \mathbf{ln(FDIpc)}_j + \alpha_4 \mathbf{GDPg}_j + \\ + \alpha_5 \mathbf{ln(Infl)}_j + \alpha_6 \mathbf{Pop\_g}_j + \alpha_7 \mathbf{ln(GDPpc)}_j + \alpha_8 \mathbf{Edu}_j + \alpha_9 \mathbf{Health} \quad (9)$$

$$\mathbf{Ln[Pov(1)]}_j = \beta_0 + \beta_1 \mathbf{Corr}_j + \beta_2 \mathbf{DebtR}_j + \beta_3 \mathbf{ln(FDIpc)}_j + \beta_4 \mathbf{GDPg}_j + \\ + \beta_5 \mathbf{ln(Infl)}_j + \beta_6 \mathbf{Pop\_g}_j + \beta_7 \mathbf{HDI}_j \quad (10)$$

$$\mathbf{SQRT[Pov(2)]}_j = \alpha_0 + \alpha_1 \mathbf{Corr}_j + \alpha_2 \mathbf{DebtR}_j + \alpha_3 \mathbf{ln(FDIpc)}_j + \alpha_4 \mathbf{GDPg}_j + \\ + \alpha_5 \mathbf{ln(Infl)}_j + \alpha_6 \mathbf{Pop\_g}_j + \alpha_7 \mathbf{ln(GDPpc)}_j + \alpha_8 \mathbf{Edu}_j + \alpha_9 \mathbf{Health} \quad (11)$$

$$\mathbf{SQRT[Pov(2)]}_j = \beta_0 + \beta_1 \mathbf{Corr}_j + \beta_2 \mathbf{DebtR}_j + \beta_3 \mathbf{ln(FDIpc)}_j + \beta_4 \mathbf{GDPg}_j + \\ + \beta_5 \mathbf{ln(Infl)}_j + \beta_6 \mathbf{Pop\_g}_j + \beta_7 \mathbf{HDI}_j \quad (12)$$

The regression results and heteroscedasticity tests for the above equations are shown below in Table 8.

Table 8. Heteroscedasticity-adjusted Regression results

	Eq.9 ln[Pov1] (9)	Eq.10 ln[Pov1] (10)	Eq.11 sqrt[Pov2] (11)	Eq.12 sqrt[Pov2] (12)
Corr	-0.14	-0.47	-1.08	-1.19
	(-0.02)	(-0.30)	(-0.79)	(-1.24)
DebtR	0.04	0.02	0.02	0.02
	(1.38)	(1.03)	(0.96)	(1.25)
Ln(FDIpc)	-0.05	-0.003	-0.05	0.19
	(-0.08)	(-0.00)	(-0.10)	(0.46)
GDPg	-0.20	-0.11	-0.29*	-0.25**
	(-0.90)	(-0.59)	(-1.78)	(-2.17)
Ln(Infl)	-0.12	-0.22	-0.07	0.06
	(-0.19)	(-0.42)	(-0.16)	(0.19)
Pop_g	0.32	0.35	0.43	0.53
	(0.35)	(0.40)	(0.64)	(1.01)
Ln(GDPpc)	-1.70**		-1.88***	
	(-2.19)		(-3.28)	
Edu	0.22		0.07	
	(1.42)		(0.60)	
Health	-0.40		-0.21	
	(-1.34)		(-0.95)	
HDI		-36.37**		-40.01***
		(-2.73)		(-4.99)
Intercept	-8.75	27.00	14.66	36.57
	(-0.43)	(2.07)	(0.98)	(4.66)
No. of obs	23	23	23	23
R-squared	0.70	0.66	0.79	0.85
Adj. R-squared	0.49	0.50	0.65	0.78
S.E.E.	54.46	60.96	29.77	22.06
Chi - square	0.18	0.31	0.76	1.01

* Significant at 10%
** Significant at 5%
*** Significant at 1%

Using the logarithm of Pov1 and the square root of Pov2 has removed the heteroscedasticity from all four equations. The calculated value of the chi-squared is smaller than the tabular value at 95 percent probability, so the null hypothesis of constant variance cannot be rejected now.

Also, for all four cases, the difference between R-squared and adjusted R-squared is smaller, and the explanatory power of the remaining independent variables has

increased. But most of the variables are not statistically significant, such as corruption, external debt ratio, foreign direct investment, inflation, and population growth rate in all the equations, and GDP growth in some of them.

5.3.3. Final Regression Results

After eliminating some of the empirically insignificant variables, the final regression equations are as follows:

$$\mathbf{Ln[Pov(1)]}_j = \alpha_0 + \alpha_1 \mathbf{DebtR}_j + \alpha_2 \mathbf{GDPg}_j + \alpha_3 \mathbf{ln(GDPpc)}_j + \alpha_4 \mathbf{Edu}_j + \\ + \alpha_5 \mathbf{Health}_j \quad \textbf{(13)}$$

$$\mathbf{Ln[Pov(1)]}_j = \beta_0 + \beta_1 \mathbf{DebtR}_j + \beta_2 \mathbf{GDPg}_j + \beta_3 \mathbf{Pop\_g}_j + \beta_4 \mathbf{HDI}_j \quad \textbf{(14)}$$

$$\mathbf{SQRT[Pov(2)]}_j = \alpha_0 + \alpha_1 \mathbf{Corr}_j + \alpha_2 \mathbf{DebtR}_j + \alpha_3 \mathbf{GDPg}_j + \alpha_4 \mathbf{Pop\_g}_j + \\ + \alpha_5 \mathbf{ln(GDPpc)}_j + \alpha_6 \mathbf{Health}_j \quad \textbf{(15)}$$

$$\mathbf{SQRT[Pov(2)]}_j = \beta_0 + \beta_1 \mathbf{Corr}_j + \beta_2 \mathbf{DebtR}_j + \beta_3 \mathbf{GDPg}_j + \beta_4 \mathbf{Pop\_g}_j + \beta_5 \mathbf{HDI}_j \quad \textbf{(16)}$$

The results are given below in Table 9.

Table 9. Final results of the empirical model

	Eq. 13 ln[Pov1] (13)	Eq. 14 ln[Pov1] (14)	Eq. 15 sqrt[Pov2] (15)	Eq. 16 sqrt[Pov2] (16)
Corr			-1.145	-1.303*
			(-1.22)	(-1.69)
DebtR	0.033	0.019	0.015	0.017
	(1.49)	(0.94)	(0.94)	(1.31)
GDPg	-0.198*	-0.182	-0.269***	-0.244***
	(-1.68)	(-1.39)	(-2.59)	(-2.99)
Pop_g		0.477	0.497	0.405
		(0.72)	(0.93)	(0.96)
Ln(GDPpc)	-1.965***		-1.874***	
	(-4.43)		(-4.07)	
Edu	0.236**			
	(1.87)			
Health	-0.398*		-0.169	
	(-1.64)		(-0.92)	
HDI		-35.95***		-38.69***
		(-3.87)		(-6.22)
Intercept	-7.937	26.73	20.73	36.74
	(-0.64)	(3.60)	(4.67)	(6.33)
No. of obs	23	23	23	23
R-squared	0.69	0.65	0.79	0.84
Adj. R-squared	0.60	0.57	0.71	0.80
S.E.E.				
Chi – square	0.21	0.24	1.37	0.79

* Significant at 10%
** Significant at 5%
*** Significant at 1%

Table 9 shows further improvements over the previous results. The explanatory power of the included variables has increased. They explain from 65 to 84 percent of the variation in poverty resulting in a rise in the overall significance of the models. The gap between R^2 and the adjusted R^2 is narrower, the slopes of the independent variables are as expected, and the results conform to the trends reported earlier in this chapter and to economic theory. The heteroscedasticity is also not present in any of the final four equations.

The results show that, when the GDP grows by 1 percentage point, about 2.33 percent of population on average is pulled up above the $2 poverty line[26] (Equation 15). The growth variable is not highly significant for the $1 poverty line.

Further more a one percentage point increase in the external debt-GDP ratio is associated with a 3.3 percentage point increase in the poverty headcount. As discussed in connection with model specification in Chapter 4, the use of aid or foreign debt depends to a large extent on the absorptive capacity of the country. Any debt that exceeds the optimal level indicates a smaller contribution to output and possibly in a greater incidence of poverty. The annual data on debt-GDP ratio shows an increasing trend for most countries, rising up to 25 to 60 percent of GDP in the sample countries. While these ratios may not be near those for the highly indebted countries in the world, the capacity to utilize debt in the transition economies still remains a question.

Increasing the average GDP per capita by one percentage point leads to a 1.96 percentage point drop in the $1 poverty headcount. All countries started transition with widely varying GDPs per capita, but for the first years of the transition process, the GDP per capita decreased drastically for all of them, which contributed to the massive rise in the poverty headcount. As the economies started to recover, the poverty headcount slowly decreased.

The average education coefficient is statistically significant and it appears with a positive sign. A one-unit increase in the education variable (the ideal years to graduate as a percentage of actual years taken) results in a 2.36 percentage points increase in the $1 poverty headcount. This looks odd unless many of the educated people cannot get a decent job even though the average level of education is rising. In addition, the

interpretation of this coefficient is a little problematic since the difference in the education values across countries is rather small in the face of a large variation in poverty. This implies that the education coefficient is estimated to be too large to indicate a realistic marginal effect on poverty.

An increase in the corruption index by one unit leads to a drop in the (square root of) $2 poverty headcount by 1.14 units. This is a very small change taking into account that the corruption index takes values between 0 and 4.

Finally, HDI has a large coefficient and is statistically highly significant as well. This is the most consistent result from the entire econometric exercise, and may indicate some strong implications for policy. A small change in HDI is associated with a large opposite change in the poverty headcount.

CHAPTER VI

CONCLUSIONS

The main purpose of my thesis is to analyze poverty and income distribution in the transition economies of Eastern Europe and former Soviet Union. The first wave of reforms in these countries witnessed falling output, increasing income inequality and escalating poverty as the state lost control of most of the resources and could not provide a social safety net. Now that a prolonged period of declining output has passed, the prospects look much better for the resumption of economic growth. Over the last 5 years, most of the economies have rebounded while some have even achieved a higher level of growth than before the end of central planning. Whether income distribution will improve or the poverty rate will fall, however, remains a concern.

Within the transition world, there are significant differences. Most of the CIS countries have high poverty headcounts and low GDP per capita whereas the CEE states have smaller incidence of poverty and higher per person income. The former group experienced a deeper decline and a slower recovery, and secured less help from the West.

The large structural changes that the economies in this research have undergone implies that the results of any econometric study for this period need to be supplemented with analysis based on tables and charts as well. Transition to a new economic system is never smooth, rendering the capture, econometrically, of the marginal influence of a variable on another more difficult. The poverty research in this study therefore gives equal emphasis on the econometric and simpler statistical methods of inquiry.

Poverty and income distribution have moved in the same direction in these economies. Considering the extremely low degrees of inequality before 1989, it is only natural that the transition would cause a worsening of distribution in income and wealth. Yet, the deterioration went on to such an extent that millions were also thrown into absolute poverty. In the cross section data analyzed, income distribution follows a rather moderate inverted U. Inequality first rises and then falls with per capita income, as we move from poorer to richer countries. On average, the richest 20 percent of population hold double the income share held by the poorest 40 percent of population.

Income inequality is higher in most of the CIS than in the CEE countries, a fact shown both by the Lorenz curves and the Gini coefficient, with lowest income inequality in Hungary, the Slovak Republic and the Czech Republic, and highest inequality in Russia, Estonia and Armenia.

Among factors that are positively associated with poverty in the transition economies, external debt ratio and population growth rate have been prominent, as explained in section 5.1. On the other hand, foreign aid, external debt, foreign direct investment, GDP growth, GDP per capita, exports, trade, domestic savings, HDI, life expectancy, and health expenditures show a negative correlation with poverty.

Some of these results from the trend and correlation analysis, however, do not stand the more rigorous econometric exercise. The regression results analyzed in section 5.3 differ between the $1 and $2 poverty lines, and each of these sets of results also depends on the particular human development indicator used. The human development indicators used in this study are combinations of GDP per capita, life expectancy, education coefficient, and health expenditures ratio.

Some of the independent variables were dropped due to a high degree of multicollinearity or due to statistical insignificance. After correcting for these problems and the problem of heteroscedasticity, the final regression results show that the rate of economic growth, the per capita income, and the Human Development Index have statistically significant coefficients and they influence poverty negatively as expected. Income and growth remain the most important factors affecting poverty.

The HDI, which includes education and health indicators as well as per capita income, is found to exert the greatest influence on poverty. This shows that a broad-based policy that targets both economic and social improvements lowers poverty more than one that focuses exclusively on average income growth. However, the fit of the equation is reduced when we separate HDI into its income, health, and education components, with education and health variables turning statistically insignificant for Pov2.

Overall, the $2 poverty headcount performs better in explaining the variation in poverty. For quite a few countries, particularly in the CEE region, the only relevant poverty line is the $2 line in any case.

Another interesting finding, though something of a surprise, is that a higher level of corruption seems to correlate with lower poverty in the transition economies. If deepening poverty reduces people's ability to bribe government officials for a given level of public services, the equilibrium may occur at a lower level of both overall corruption and public services. The findings in my thesis would be consistent with that story.

As mentioned before, the results of my quantitative analysis must be taken with a high degree of caution. First, the sample size is large in that 23 out of a maximum possible 26 transition economies are the subject of this study. Yet, a cross section study

on as small a sample as 23 is beset with its own problems, particularly in using statistical tests that are mostly based on large samples. If panel data could have been used, the sample size could be significantly increased. Unfortunately, too many missing data for different years for various countries made it impossible to arrive at a larger sample. Further, a relatively large number of explanatory variables used in my econometric exercises combined with the small sample size resulted in small degrees of freedom.

Second, dramatic institutional and other changes that occur during a transition process make it less suitable to use an econometric model that does not account directly for those changes. The marginal effect of an explanatory variable on poverty is hard to estimate from the variable's coefficient when the changing institutions are not controlled for. The results can at best be indicative of the probable direction of change on poverty rather than the magnitude of such changes.

These limitations of my study could be taken to suggest numerous possibilities for further research. *First,* the major differences between the CEE and CIS countries probably call for separate model specifications. *Second,* to the extent the type, size, sequence, and duration of policy reforms can be measured they could be directly included in analysis. This could help evaluate any differential impact of the reforms implemented. *Third,* to the extent possible, greater efforts could be made to collect panel data that would allow the use of the panel data estimation techniques for greater rigor and accuracy of the estimates.

To sum up, the finding of a World Bank (2000a) study seems appropriate here:

> Some countries in the region have moved more effectively than others to tackle poverty. But even the most successful reformers in the region can do more to

foster the growth of productive employment, educate their children better to improve their labor productivity in the globalizing market economy, help people cope with the major risks of old age security, health, and unemployment in a fiscally sustainable manner, and address the needs of an emerging underclass of poor. (p.135)

FOOTNOTES

1. "New Europe" is comprised of transition countries of Central Europe, the Balkans and the Baltics
2. By 2003, even with strong economic growth since 1999, Russia had recovered only 71 percent of its 1990 output.
3. Rosapepe (2004) accentuates the positive influence of adherence to the European Union of the transition countries.
4. Rosapepe (2004) accentuates the differences between the former Soviet Union and its satellites after 1990.
5. An example is the May issues of *American Economic Review* that include prominent articles presented in the AEA Annual Conferences and included at least seven articles in 1991 and 1992 on the transition of the former Soviet and Eastern European economies, but none of them contained the word "poverty".
6. For a more detailed account of trends in agriculture see Swinnen, and Beerlandt, (2002)
7. Social insurance in the rich Western economies manages insecurity (and usually also redistributes to the poor) mainly through a tax and transfer system.
8. Purchasing Power Parity
9. Czech Republic, Hungary, Slovak Republic and Slovenia have a relatively high average incomes both before the transition and in 1993-1995, with very few people below poverty line
10. The increase in inequality meant that those at the bottom of the income distribution received an even smaller share of a shrinking pie.

11. By 1995, most of the CIS and CEE countries had not yet reached their 1990 output. Russia experienced a strong economic growth starting 1999.
12. The exception is FYR Macedonia, where a trade embargo in 1994-1995 has hindered the revival of growth.
13. The average length of a recession in United States has been 11 months
14. A complete analysis of the $1and $2 PPP poverty lines can be found in World Bank (2002) "World Development report 2000/2001: Attacking poverty".
15. See details regarding purchasing power parity in Ray (1998), chapter 2.
16. For more issues in the measurement of poverty (the welfare indicator – consumption or income, what should be included, how it should be valued; the poverty line – at what level it should be set; and the poverty measure) see Ravallion (1996)
17. For a systematic approach in analyzing the major issues raised regarding the official methodology for estimating poverty lines in the Philippines, see David and Maligalig (2001)
18. See details regarding Human Development Index in Ray (1998), chapter 2.
19. For a good and modern treatment of such decomposition, see Bourguignon (2003).
20. Ray (1998), Chapter 6, presents an excellent discussion of these principles together with the popular measurements of income inequality.
21. Aid includes donations (money or goods and services), grants, technical cooperation, and assistance.
22. See World Bank (2004), *Social Protection Projects*

23. The aid comprises donations of financial resources or of goods or services and grants by official agencies.
24. The Kuznets ratio was calculated as the ratio of richest 10 percent of population to poorest 20 percent of population.
25. Coefficient of variation, calculated as the standard deviation of the income quintiles over mean of income.
26. The average poverty rate is 20 percent for the $2 line. The GDP growth coefficient of -0.269 indicates that the square root of 20 declines by that amount in response to a percentage point increase in growth. Once the new number is squared back, we find the new headcount to be 17.7 or a fall of 2.3 percentage points.

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APPENDIX

Table 1A. Incidence of poverty and GDP per capita

Country	$2 PPP	GDP per capita
Albania	11.81	1469.57
Armenia	48.99	2215.43
Azerbaijan	33.41	704.53
Belarus	0.68	1273.05
Bulgaria	16.2	1712.75
Croatia	0.53	4458.91
Czech Republic	0.23	13341.22
Estonia	4.69	8204.42
Georgia	15.70	612.40
Hungary	1.52	10746.37
Kazakhstan	8.45	1487.18
Kyrgyz Republic	27.17	307.79
Latvia	11.52	5995.50
Lithuania	6.9	3187.24
Moldova	64.05	346.46
Poland	1.18	8449.99
Romania	20.47	1643.23
Russian Federation	23.76	1783.49
Slovak Republic	2.41	9319.48
Slovenia	0.06	14913.93
Tajikistan	58.67	290.84
Ukraine	31.37	3457.63
Uzbekistan	71.71	556.06

Table 2A. Incidence of poverty in transition economies

Zone		Country (and year of the survey)	Poverty headcount	
			$1 PPP	$2 PPP
CEE	Central Europe	Czech Republic (1996)	0.12	0.23
		Hungary (1998)	0.38	1.52
		Poland (1999)	0.61	1.18
		Slovak Republic (1996)	0.02	2.41
	Balkan	Albania (2002)	0.23	11.81
		Bulgaria (2001)	4.73	16.2
		Croatia (2001)	0.08	0.53
		Romania (2000)	2.14	20.47
		Slovenia (1998)	0.02	0.06
	Baltics	Estonia (1998)	0.08	4.69
		Latvia (1998)	1.53	11.52
		Lithuania (2000)	0.53	6.9
CIS	European CIS	Belarus (2000)	0.11	0.68
		Moldova (2001)	21.78	64.05
		Russian Federation (2000)	6.14	23.76
		Ukraine (1999)	2.92	31.37
	Caucasus	Armenia (1998)	12.83	48.99
		Azerbaijan (2001)	3.67	33.41
		Georgia (2001)	2.71	15.7
	Central Asia	Kazakhstan (2001)	0.11	8.45
		Kyrgyz Republic (2001)	0.86	27.17
		Tajikistan (1998)	13.87	58.67
		Uzbekistan (2000)	17.32	71.71

Table 3A. Poverty and macroeconomic indicators for 23 countries of Europe and Central Asia.

Country	Pov1	Pov2	Aid_pc (avrg, $)	Corr	DebtR (avrg)	FDIpc (avrg $)	GDPg (avrg)	Infl (avrg)
Albania	0.23	11.81	91.59	3.10	28.71	29.80	5.17	11.20
Armenia	12.8	48.99	46.73	1.90	23.63	45.11	-3.11	896.58
Azerbaijan	3.67	33.41	18.69	2.07	16.10	66.79	4.81	85.41
Belarus	0.11	0.68	8.09	2.14	5.60	14.74	1.12	474.07
Bulgaria	4.73	16.2	29.34	2.53	87.27	66.15	0.20	167.65
Croatia	0.08	0.53	15.82	2.29	34.32	190.08	3.97	5.17
Czech Republic	0.12	0.23	12.44	2.15	27.45	124.37	0.15	20.36
Estonia	0.06	4.69	44.91	1.85	23.04	142.12	-1.16	152.84
Georgia	2.71	15.70	44.70	2.87	52.15	24.86	5.62	12.07
Hungary	0.38	1.52	20.13	1.93	62.16	215.76	1.65	20.18
Kazakhstan	0.11	8.45	9.77	1.99	23.04	96.22	2.58	37.49
Kyrgyz Republic	0.86	27.17	50.19	2.36	77.02	11.57	4.02	25.40
Latvia	1.53	11.52	27.33	2.25	18.06	106.09	-4.74	161.40
Lithuania	0.53	6.9	31.90	2.15	20.16	106.37	2.14	20.55
Moldova	21.8	64.05	18.32	2.65	53.44	17.19	-1.06	23.95
Poland	0.61	1.18	39.66	2.24	37.87	111.34	5.39	19.97
Romania	2.14	20.47	12.93	2.70	24.58	40.23	0.43	73.48
Russian Federation	6.14	23.76	9.77	1.99	40.14	16.27	-1.39	92.99
Slovak Republic	0.02	2.41	13.70	2.44	26.14	43.24	-1.40	14.71
Slovenia	0.02	0.06	26.20	1.63	33.08	92.08	2.67	44.37
Tajikistan	13.87	58.67	12.45	2.27	49.36	3.15	0.87	172.60
Ukraine	2.92	31.37	7.15	2.44	19.47	9.06	-9.21	689.62
Uzbekistan	17.32	71.71	4.92	1.71	15.35	4.15	1.50	270.29

Table 3A – cont

Country	FLFPR (avrg)	Pop_g (avrg)	GDPpc (avrg)	LifeE (avrg)	Edu (avrg)	HealthExpR (avrg)	HDI
Albania	41.55	0.87	1069.95	73.22	88.80	3.47	0.735
Armenia	45.34	0.69	521.08	72.44	99.80	7.80	0.729
Azerbaijan	37.74	0.93	525.87	69.00	97.45	1.97	0.744
Belarus	47.77	-0.27	2086.75	68.38	98.25	6.12	0.804
Bulgaria	47.82	-0.73	1458.06	71.15	89.88	4.23	0.795
Croatia	39.90	-0.30	4311.51	72.80	99.75	10.20	0.818
Czech Republic	49.77	-0.06	3821.51	72.65	98.05	6.34	0.861
Estonia	50.71	-1.13	2999.30	68.79	95.47	6.18	0.833
Georgia	43.58	0.10	553.35	72.84	98.68	2.90	0.746
Hungary	44.70	-0.33	4193.53	69.82	93.50	7.40	0.837
Kazakhstan	43.66	-1.24	1325.70	64.39	94.79	4.60	0.765
Kyrgyz Republic	39.00	1.17	382.80	66.50	94.55	4.30	0.727
Latvia	50.31	-1.19	2199.15	68.40	90.13	5.70	0.811
Lithuania	46.88	-0.39	2425.74	70.84	98.10	5.46	0.824
Moldova	45.90	-0.27	409.47	66.82	96.97	8.08	0.700
Poland	45.13	0.10	3295.34	72.30	95.80	6.07	0.841
Romania	41.27	-0.19	1505.18	69.44	92.54	4.32	0.773
Russian Federation	48.02	-0.33	2377.82	65.69	97.00	4.62	0.779
Slovak Republic	48.61	0.12	2778.75	71.90	96.73	6.31	0.836
Slovenia	45.03	-0.09	8270.67	73.90	98.68	7.63	0.881
Tajikistan	32.34	1.45	160.86	67.67	89.80	6.60	0.677
Ukraine	45.49	-0.63	1034.01	67.70	98.40	5.30	0.766
Uzbekistan	37.85	1.67	727.37	68.86	99.90	4.47	0.729

Figure 1A. Scatter plot matrixes, all independent variables, both poverty lines

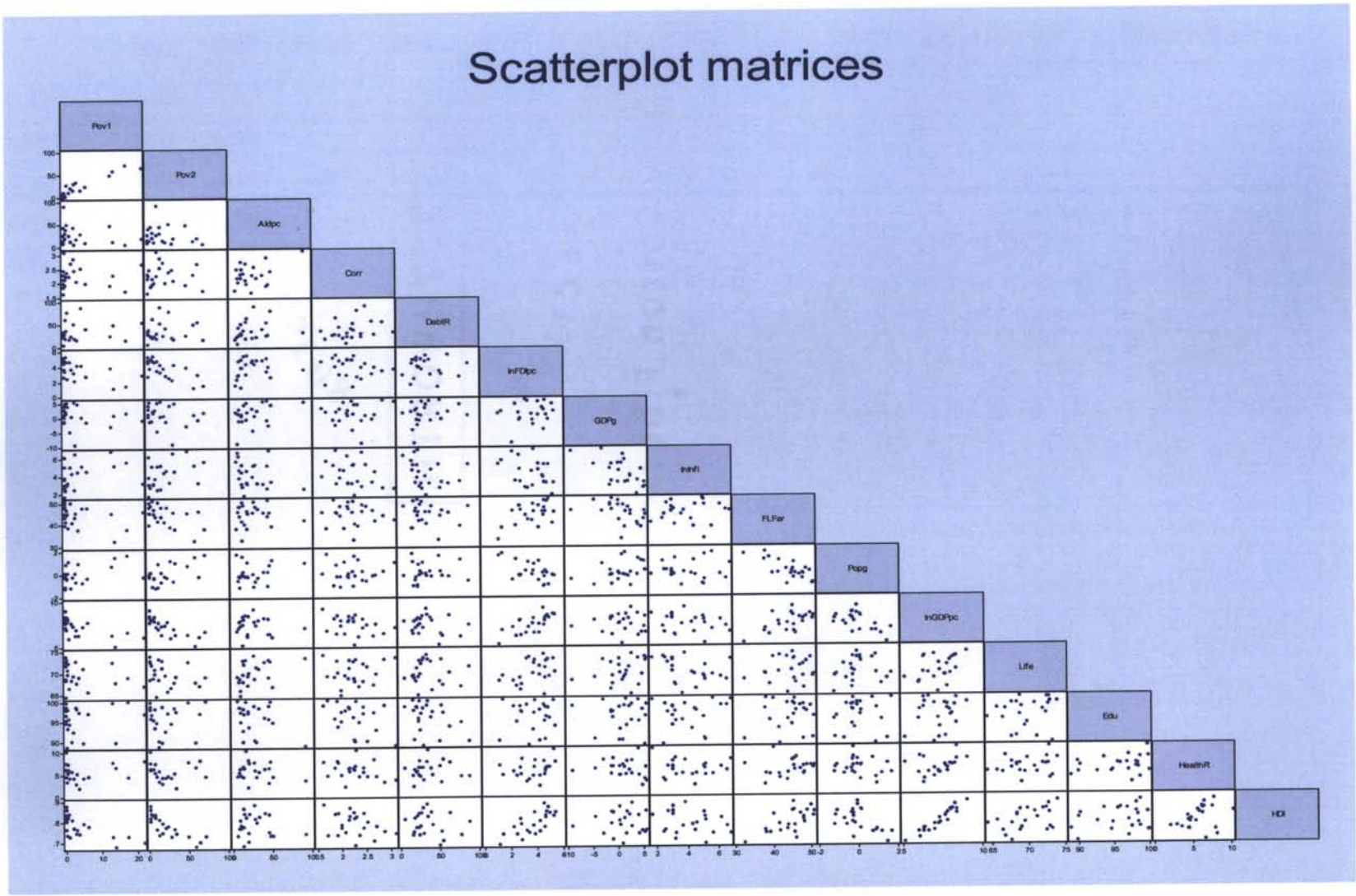

Table 4A. Correlation matrix for $1 and $2 poverty line, all 13 independent variables.

	Pov1	Pov2	Aid_pc	Corr	DebtR	Ln (FDIpc)	GDPg	Ln (Infl)	FLFPR	Pop_g	Ln (GDPpc)	LifeE	Edu	Health ExpR	HDI
Pov(1)	1.00														
Pov(2)	0.93	1.00													
Aid_pc	-0.20	-0.16	1.00												
Corr	-0.04	-0.02	0.41	1.00											
DebtR	0.12	0.08	0.21	0.28	1.00										
ln(FDIpc)	-0.60	-0.72	0.15	-0.18	-0.04	1.00									
GDPg	-0.21	-0.22	0.36	0.12	0.22	0.18	1.00								
ln(Infl)	0.35	0.43	-0.27	-0.36	-0.29	-0.42	-0.63	1.00							
FLFPR	-0.33	-0.52	0.01	-0.09	-0.14	0.49	-0.44	0.06	1.00						
Pop_g	0.43	0.57	0.18	0.04	0.08	-0.59	0.37	0.02	-0.74	1.00					
ln(GDPpc)	-0.64	-0.79	-0.11	-0.33	-0.21	0.72	0.00	-0.29	0.61	-0.57	1.00				
LifeE	-0.27	-0.38	0.41	0.16	-0.02	0.40	0.30	-0.34	0.12	0.15	0.39	1.00			
Edu	0.10	0.05	-0.34	-0.43	-0.37	0.01	-0.03	0.04	0.11	0.06	0.17	0.15	1.00		
HealthExpR	0.14	-0.12	-0.22	-0.30	0.00	0.27	-0.22	-0.10	0.16	-0.20	0.36	0.21	0.26	1.00	
HDI	-0.69	-0.82	-0.11	-0.35	-0.17	0.74	0.00	-0.26	0.63	-0.54	0.95	0.44	0.18	0.31	1.00